BULLETIN OF MISCELLANEOUS INFORMATION No. 8 1927
ROYAL BOTANIC GARDENS, KEW

## XXXVIII.—GOSSYPIUM. Sir George Watt.

The following notes (continued from *Kew Bulletin*, 1926, page 210) complete the observations, intended to be here offered, on certain specimens of Cultivated and Wild Cottons, preserved in the Herbaria of the Royal Botanic Gardens of Kew and Edinburgh.

[The references cited below are to Watt's Wild and Cultivated Cotton Plants of the World.]

Section I.—Species with Fuzz but no Floss: Bracteoles Free.

**G. Stocksii** *Mast.*; Watt, l.c. p. 73, plate 6.
India, Sind. A wild species.

Section II.—Species with both Fuzz and Floss: Bracteoles United.

**Leaves 3–5-palmately (sometimes almost pedately) 3–7-lobed: lobes curvilinear, bristle-tipped: base distinctly cordate, usually central vein only with a gland.*

**Gossypium anomalum** *Watt*, sp. nov.

*Ramuli* teretes, leves, glabri, canescentes, punctis minutis inconspicuis. *Folia* levia, canescentia, rotundata, subcordata, acuta, in 3–7 lobos angustos curvilineares profunde incisa, lobo medio lateralibus longiore, sinibus elevatis, costa in petiolum decurrente; glandulae infra nervos 1–3 sitae; lobi exteriores saepe lobulis supernumerariis instructi; petiolus lobo medio brevior. *Ramuli floriferi* 1–2-flori, axillares. *Bracteolae* breves, ovatae, cordatae, subliberae, conniventes, superne 3–5 dentibus brevibus, punctis glandulosis fere carentes, cordaturis etiam eglandulosis. *Petala* flava sine maculis purpureis. *Semina* atra, lana duplici vestita, breviore (" fuzz") basin et apicem seminis tantum vestiente, longiore (" floss ") brevi alba sericea.

Africa. " Chickenfoot " ; seeds selected from Chinese Cottons and grown at Giza, Cairo (*C. 853* and *C. 854*).

*Twigs* round smooth glabrous and canescent, dots minute and inconspicuous. *Leaves* smooth canescent, rotund, the older ones sparingly cordate acute, deeply incised into 3–7 narrow curvilinear lobes, much as in *G. arboreum* var. *neglectum*, central lobe a little longer than the laterals and with the sinuses thrown up, central vein running through into the petiole; glands 1–3 on veins; lower pair of lobes often bear supplementary teeth; petioles a little shorter

than the central lobe. *Inflorescences* 1- or 2-flowered, axillary. *Bracteoles* short, ovate cordate almost free, but connivent and bear 3–5 short teeth on the apex, almost devoid of gland-dots, and glands within the cordature also absent. *Flowers* yellow, without purple spots. *Seeds* black but with an imperfect tuft of fuzz at both ends, *floss* short white silky.

At first glance this looks like a glabrescent and canescent *G. arboreum* var. *neglectum* but on closer study is recognisable as a distinct species (or a distinctive hybrid). The seed is most remarkable being quite unlike that of any other Asiatic cotton and the bracteoles are almost free. Indeed it might have to be placed with the naked seeded cottons though in most respects it is an Asiatic form. It brings to mind the plant dealt with by me (*Watt*, l.c. p. 153) under the name of *Tellapatti*, a cotton which in South India is sometimes called the Black-seeded *Jowarihathi*, a hybrid stock, very possibly a cross between Uppam and Bourbon. The anomalous Chinese cotton would appear to be a cross between *G. arboreum* var. *neglectum* x *G. purpurascens* (Bourbon cotton) and is well worthy of special consideration.

SECTION III. FUZZY-SEEDED COTTONS WITH FREE BRACTEOLES.

*Leaves* generally large, 3–5 or 7-palmatifid, pilose, rarely tomentose, or still more rarely glabrous : *peduncles* thicken upwards and usually carry conspicuous external and internal glands : union of the *bracteoles* (when met with) seems a consequence of hybridisation, otherwise they are quite free : *seeds* large with a distinct and mostly complete *fuzz* and firmly adhering *floss*.

American, West Indian and African species (none of them Asiatic) ; they constitute a parallel assemblage to the Asiatic Cottons of Section II.

**Leaves broad, pilose-tomentose* (*rarely glabrescent*), *one-half segmented on the apex into* 3 (*imperfectly and only occasionally* 5) *ascending lobes, the lobes broad triangular* : *petals mostly with purple claws.*

†Leaves thick granularly tomentose ; bracteoles with long linear ciliate teeth ; capsule 3-celled.

**G. mustelinum** *Miers* ; Watt, l.c. pp. 167–8, plate 26.

*Twigs*, peduncles and petioles purple, angled. *Leaves* broad thick leathery, 3- (very occasionally 5-) lobed, 3 inches long by 4–5 broad, lobes broad, the centre one often 2 inches across, oblong-deltoid acute granularly tomentose and matted especially on the under surface of the young leaves, sinus between the lobes open spreading, leaves of the flowering branchlet often small entire ovate-oblong acute hardly cordate but sometimes 2-lobed and borne on short slender petioles, glands prominent on one or three nerves. *Bracteoles* ovate-rotund free auriculate and with long narrow linear ciliate teeth, the lower pair often seemingly thrown across the cordature, gland within the cordature not very distinct, on the calyx none.

*Flowers* very large. *Calyx* loose campanulate, cut square across or undulate. *Corolla* tomentose externally, yellow with purple claw and becoming tinged purple. *Capsule* short 3-celled prominently beaked. *Seeds* with coarsely formed fuzz white green or rusty which, in cultivated states, often becomes reduced to a rusty tuft around the beak. The seeds usually free but in certain hybrid forms seem to adhere in consequence of the firm interlacing of the floss.

A wild species only recently identified as met with under cultivation and some of the specimens of which have hitherto been placed under the allied species, *G. peruvianum*. Leaves thick granularly tomentose (in cultivated hybrids sometimes becoming almost glabrescent), 3- (rarely 5-) lobed with the sinus open wide and not thrown up in a fold, bracteoles rotund, at first small with short teeth, but enlarging rapidly as the fruit forms and then having long narrow linear ciliate teeth, capsule ovate beaked 3- (sometimes 4-) celled, seeds with coarse fuzz.

South America. The type of the species may be said to be the plant collected in 1838 in Ceará, Brazil, *Gardner, 1463*, and stated by him to have been found in the woods ; also Colombia in 1853, *Holton, 749*. The cultivated forms, recently identified, extend the area very considerably.

The following have to be placed under this species :—*Sparingly tomentose forms* ; the plant collected by *Mr. Jose Maria Fernandes* at Maranhao Coroata, Brazil (*1, 2* & *4* of 18th May, 1922), of which he remarks that the fuzz is confined to the apex of the seed and that the capsule is sometimes 4-valved (leaves less tomentose than in the type, lobes bristle-tipped, stipules linear, flowers large) : also in Bolivia by *Dr. Otto Buchtien, 3220*. Then crossing the Atlantic the same plant re-appears in Africa. The Director of Agriculture, Ibadan, N. Nigeria (Dec. 1913) sends it as one of the forms of the cottons there known as *Meko* and *Mr. W. H. Johnson* found it cultivated in Moçambique (*8* of 21st Oct., 1906). He speaks of it as attaining a height of 6 feet and adds that the young leaves show oil glands.

It would seem highly probable that *G. mustelinum* has contributed to the formation of some of the cultivated pilose cottons often placed under *G. peruvianum*, *G. brasiliense*, *G. microcarpum*, and possibly also of *G. hirsutum*. The forms with broad thick (leathery) 3-lobed leaves, more especially those which show a tendency to glandular hairs, are doubtless traceable to this species. The variability of the seed, from a coarse though complete fuzz to a black and semi-naked condition, with a tuft of fuzz around the beak, and so again the seeds free or agglutinated, are features that occur so frequently as to render the separation of *G. microcarpum*, *G. peruvianum*, *G. brasiliense* and even *G. barbadense* often extremely difficult. Nevertheless a glabrous condition of foliage, in association with a naked (or practically naked) seed (whether agglutinated or free) and where the floss separates readily from the seed, are the best

eye-marks in the determination of *G. barbadense* from *G. peruvianum* and its associates.

†2. Leaves trifid (3 triangular lobes) veins 5, prominately arching upwards, sparsely coated below with strong hyaline stellate hairs ; dots inconspicuous ; bracteoles deeply gashed, teeth linear and with the veins prominent, becoming glabrous : capsule rotund 4-celled apiculate : seeds large irregular with fuzz and floss rufous.

**Gossypium nervosum** *Watt*, sp. nov.

*Folia* versus apices ramulorum approximata, parva, 2·5–4 cm. longa, ovato-rotundata, breviter cordata, indivisa vel breviter triloba lobis triangularibus, obscure punctata, subtus et marginibis pilis firmis stellatis hyalinis induta praesertim inferne ; nervi 5, sursum conspicue arcuati, eglandulosi vel nervus medius tantum glandulam infra gerens ; petiolus quam lamina longior, stellato-pilosus ; stipulae parvae, lineares, mox caducae. *Ramuli floriferi* breves, compacti, acute angulati, internodiis brevibus, cicatricibus prominentibus, purpurei, praecipue versus apices villosi ; pedicelli breves, crassi, triangulares, apice glandulis crassis intra bracteolarum cordaturas sitis. *Bracteolae* liberae, sessiles, auriculatae, apice profunde incisae, dentibus longis linearibus apice ciliatis, dente medio ceteris multo longiore paene lineari ; nervi valde prominentes primo stellato-pilosi deinde glabri. *Calycis dentes* triangulares, acuminati. *Capsula* rotundata, 4-locularis, valvis planis subito apiculatis. *Semina* magna, irregularia, erostrata, lana rufa duplici vestita, longiore (" floss ") firme affixa, aspera, sparsa.

America. This, which would appear to be a wild species and presumably a small densely branched bush, was collected 20th April, 1910, by *Dr. Edward Palmer 351* (type) in the vicinity of Panuco, Vera Cruz, Mexico.

*Leaves* clustered on the extremities of the twigs and flowering-spurs, small, 1 to 1½ inches, ovate-rotund, slightly cordate, entire or shortly 3-lobed, the lobes triangular, veins 5 prominently arching upwards, surface only obscurely punctate, glands on the veins usually none but sometimes one on the central vein, sparsely coated below, and on the margin, with strong hyaline stellate hairs, especially at the base and along the petiole which is longer than the blade : *stipules* small, linear, early caducous. *Flowering-spurs* short, compact, sharply angled, with short internodes and prominent leaf-scars, purple coloured and, especially near the extremities, bearing shaggy hairs : *pedicels* short thick triangular, terminating in thick glands within the cordatures of the bracteoles. *Bracteoles* quite free, sessile, auriculate, deeply gashed on apex, teeth long linear, with the tips ciliate, central tooth much the longest and nearly linear, veins very prominent and stellately hairy but becoming glabrous. *Calyx* teeth triangular, acuminate. *Capsule* rotund, 4-celled, valves flat suddenly apiculate : *seeds* large irregular coarse, not beaked ; *fuzz* and *floss* rufous, the latter firmly adhering, harsh and scanty.

The plant collected by *A. H. Curtiss* in Key West, Florida, (*5655*, May 11th, 1896) and named by him as *G. uliginosum* Linn. may be this species. So also *Mr. Lyster H. Dewey* 11, from the Experimental Grounds of Georgia, which he calls "King" and speaks of as an early drought-resisting variety, may be a cultivated state of *G. nervosum*. In some respects it approximates to *G. Darwinii* Watt; the bracteoles being quite free would bring it into Section I.

†3. Leaves villous (especially below), 3-lobed, sinus flat open, often conspicuously punctate; bracteoles with the teeth fimbriate; capsule mostly 3-celled: seeds large with grey or rust coloured fuzz.

**G. punctatum** *Sch. et Thonn.*; Watt, l.c. 168–182, plates 27 and 28.

*Twigs*, peduncles and petioles slender smooth round, purple-tinted: shoots, young leaves, and bracteoles stellately hairy, the hairs long and spreading but becoming less abundant on maturity, generally conspicuously punctate. *Leaves* often pilose on the veins and petioles, *upper leaves* ovate-cordate, entire, slightly longer than broad, 3- (or in cultivated states and hybrids 5–7) nerved, the middle one running straight through into the petiole and carrying an excavated gland: *lower leaves* one-third segmented, on the apex, into 3–5 (or in hybrids 5–7) ovate deltoid lobes.

A large woody shrub with twigs quite round; a wild species but one which is met with under cultivation and often completely acclimatised or even ferine. In cultivated states it merges, in the hairy forms, into *G. hirsutum* and, in the glabrous, into *G. mexicanum*. With regard to the segmentation of the leaf: broad-leaved forms, with the lobes only triangular teeth, are suggestive of *G. mexicanum* (and sometimes even of *G. purpurascens*): intermediate states, with 3 (or occasionally 5) ovate lobes on the apex, approach very closely to *G. hirsutum*: while the more deeply segmented forms can often, with difficulty, be distinguished from *G. peruvianum*.

It may be helpful to contrast the diagnostic features of this plant with those of *G. hirsutum* as follows:—

*Gossypium punctatum* Sch. et. Thonn.

*Leaves* ovate-oblong 3-lobed, the lobes deltoid acute sinus flat open, pale green, stellately villous on the veins, the hairs often long and spreading but becoming less abundant on maturity, veins ascending, upper leaves ovate frequently entire slightly longer than broad, faintly cordate, middle nerve carries a large excavated gland. *Flowers* medium-sized wide from a short tube, yellow with small irregular purple spot and pink tinge. *Bracteoles* membranaceous in certain forms glabrous and fimbriate ovate-oblong, deeply auricled with 9–11 rigid ascending teeth the central one much the longer but not accrescent. *Calyx* large loose truncate entire or rarely toothed still more rarely tailed. *Capsule* ovate oblong suddenly and sharply beaked 3–4 celled. *Seeds* very large bent and irregular: *fuzz* abundant coarse grey to rust coloured: *floss* white and silky.

*Gossypium hirsutum* Linn.

*Leaves* ovate, 3- (occasionally 5-)lobed, the lobes ovate-deltoid acute, sinus thrown up in a fold, coarse brownish-green, persistently hirsute (often glandularly) and dust coated, veins spreading, cordate, sometimes almost auricled, upper leaves soon lose the habit of being entire and are mostly 3- (occasionally 5-)lobed. *Flowers* small to large yellow with purple tinge rarely (and only in hybrids) with purple spot on the claw. *Bracteoles* ovate with many narrow flaccid teeth. *Capsule* usually 4-celled. *Seeds* large coarse often with green *fuzz* and *floss* woolly.

There may be said to be two varieties of *G. punctatum* :—

(I) var. *nigeria* Watt, l.c. 170, plates No. 27A and 28A.

*Leaves* softly tomentose to pilose, ovate-cordate acute or acuminate, entire or shortly 3-lobed, the lobes divergent, margins often stained brown, stipules large ovate-oblong-awled. *Bracteoles* small ovate acute toothed round the upper half. *Flowers* small, not much larger than the bracteoles, pale yellow, sometimes with a purple spot on the claws or purple-tinted. *Calyx* teeth acute or tailed (in hybrids often truncated). *Seeds* large with white or rufous *fuzz* and scanty white *floss*.

This would appear to be mainly an African plant and very possibly the ancestor (or one of the ancestors) of *G. hirsutum* Linn. *G. punctatum* in all its forms, may be described as an exceedingly variable plant. In the case of variety *nigeria*, departures are common in degree of hairiness, until some forms have to be described as almost glabrescent ; departures are frequent in the shape of leaf and length of the petiole ; so again departures occur in the form of the calyx from tailed to acute or even truncate ; and departures both in texture and colour of fuzz and floss are common until a rufous worthless staple is ultimately met with, in the wild or ferine forms. This variability, however, has given rise, no doubt, to the diversity found among many of the cultivated stocks, and given birth to some of the most important staples of modern commerce. In fact it would appear almost certain that this plant is closely connected with the success attained in the U.S.A. in the production of Short Staple and Upland cottons.

The following recent collections may be specially mentioned :—

Tropical Africa. N. Nigeria, the Kano annual cotton, known in the Hausa language as *Labai ; P. H. Lamb* (2nd May, 1913, no. *15*), speaks of it as "? semi-wild *G. hirsutum*." The flowers are small hardly exceeding the bracteoles and the calyx is cut square across ; a specimen, contributed by the Imperial Institute and which came from North Nigeria, *1258/13*, collected at Kazauk in February 1913, has large purple tinted flowers and with the calyx teeth terminating in long linear tails while the seeds are large with a distinct tuft of rufous fuzz and a long white silky floss. A sample from N. Bank, Gambia (communicated by the Imperial Institute), collected in Jan. 1909 has the brown tinted foliage of *G. hirsutum* but the calyx is truncate (not even toothed) and the seeds large

coarse, densely coated with rufous fuzz and a short inferior floss. It would appear to exist both wild and cultivated. The plant has also been sent to Kew by the Agric. Department of the Gold Coast where it is known as *Sagai*. It has khaki lint and fuzz and was collected by *F. N. Howes 1100* dated Jan. 1926. Specimen contributed by *W. H. Johnson III*, from the Anum Cotton Farm, Gold Coast, is spoken of as "probably introduced many years ago." It is a hybrid of *punctatum* x *mexicanum*.

A collection of specimens made by the Director of Agriculture, Ibadan, N. Nigeria, raised mostly from imported American seed is as follows:—American Upland, Georgia, is *G. punctatum* var. *nigeria*: Long Staple American Griffin is *punctatum* var. *nigeria*: Mebane "introduced" is *G. punctatum* var. *nigeria*: Long Staple American Allen is *G. punctatum* var. *nigeria*: Upland American, introduced from Nyasaland is *G. punctatum* var. *nigeria*.

Egypt. *Dr. W. Lawrence Balls, 209–3*—the Moqui cotton, as grown in Egypt is *G. punctatum* var. *nigeria*: *N. D. Simpson, C. 283* said to be "Nigeria indigenous," is a hybrid, very possibly, of this variety with *G. mexicanum*. It has the pilose (almost felted) condition of var. *nigeria* with the broad leaf and small yellow flowers of *G. mexicanum* Tod., but the leaves are deeply segmented into 5 long deltoid acuminate lobes, the veins of which often carry more than one gland and the petioles are greatly elongate and faintly winged: mention may also be made of *Simpson C. 289* described as "Nigeria exotic." This is nearer, botanically, to variety *nigeria* than is the co-called "Nigeria indigenous."

India. *Watt 13819* collected at Sauner, Nagpur, C.P.—a plant that much resembles Mollango cotton: *Duthie 12312* collected at Gilgit, Kashmir (where it is known as *Keas*), the same form apparently, viz., var. *nigeria*: lastly a specimen discovered by *R. P. Mehta 1749*, at the Bhavnagar Exper. Farm, may be described as having bractlets protecting the internal glands. It is a hybrid of *punctatum* x *hirsutum*.

Siam. *Dr. Kerr* sends a sample (*8035*) which he says is there known as *Fai Chan* and is cultivated.

(II.) var. *jamaica* Watt, l.c. 170, plates 27B and 28B. (Is strongly suggestive of *G. Birkenshawii* mihi). *Leaves* sub-glabrous (petioles sometimes pilose) more deeply lobed than in var. *nigeria* and stipules small linear awled. *Bracteoles* ovate-oblong acuminate gashed on the apex. *Calyx* teeth triangular acute or dentate. *Corolla* longer than the bracteoles, deep purple tinted. *Seeds* small irregular with rust coloured fuzz and a small quantity of dirty white wool.

An American or West Indian plant and one of the ancestors, very probably, of *G. mexicanum* Tod.: collected by *Jose Maria Fernandes* Maranhao, Coroata (*3*, 1916): Jamaica by *Dr. McNab*: Jamaica "ex legato *Alexander Prior*, April, 1903, cultivated": *A. H.*

*Curtiss* (*135*, March, 1903) found near Nassau, N. P., Bahamas: and *J. Brown-Lister* (*59*, 1901) Gambia Boundary Commission.

†4. Leaves coarse, brownish green 3- or 5-lobed, sinus thrown up in a fold, persistently hirsute (often glandular and dust-coated) veins spreading; flowers medium and purple tinged. Bracteoles ovate with many narrow flaccid teeth. Fruit 4-celled. Seeds large coarse often with green fuzz.

**G. hirsutum** *Linn.*; Watt, l.c. pp. 183–200. plates 29, 30 and 31.

The Green Seeded Cotton, New Orleans, Georgian, Short Staple American, Saw-ginned Dharwar, the only American cotton acclimatised in India, &c., is practically only a cultivated state of *G. punctatum*.

A coarse, stunted, much branched, erect, greenish-red, with leaves bronzed on margin, dust coated bush, the last mentioned peculiarity being in consequence of the abundance, length and strength of the hairs with which the shoots, leaf-stalks and veins are clothed. The hairs are, in fact, sometimes glandular. *Twigs* coarse thick strongly angled and furrowed. The *leaves* rapidly lose the habit of being entire, and become, across the apex, one half segmented into 3 lobes, and, as the result very possibly of hybridisation or simply of luxuriant cultivation, sometimes even become partially 5-lobed and occasionally even auricled. *Flowers* yellow becoming purple-tinted but not, as a rule, possessing purple blotches on the claws. *Capsule* usually 4-celled. *Seeds* always large, coarse, ovate truncate and with a pronounced and coarse *fuzz* of a greyish rusty or green colour, the green colour fading into grey with age, *floss* woolly.

The following examples may be mentioned :—

Greece. A plant (named *G. indicum* Lam.) is almost pure *G. hirsutum*

Siam: *Dr. Kerr 10089*. Cochin China: *L. Pierre 390*. China: Yunnan West, Tali Range, 7,000 ft. *G. Forrest 11554* (cultivated) is a hybrid of *G. hirsutum* x *mexicanum*.

India. *Watt 21828*, Manjri Farm, Poona: Bangalore, *4*: Akola, Berar, *1780A*: Bhavnagar, *1750*: Ellichpur, *10513*: *Jameson*, Saharanpur (*1849*) said to be "*G. arborescens*" x "*G. aegypticum*."

Tropical Africa. *S. Simpson 2*, said to be "cultivated as a perennial near Ediva, Mossamedes, Angola, and originally imported from America"—is typical: *H. H. W. Pearson 2009*, said to be "the American King," and cultivated near Ediva, S. Angola: from the *Director of Agriculture*, Ibadan, N. Nigeria, *2281-15*, leaves tending to become 5-lobed and bracteoles with very long flaccid teeth; the Director sends also a series of American cottons grown in Ibadan such as "Jones' Improved" (=*G. mexicanum* x *hirsutum*): Truitts Big Boll (*G. hirsutum* x *mexicanum*): Hawkins Extra Prolific (*G. hirsutum* x *mexicanum*).

America. U.S.A.; *Mr. Lyster H. Dewey* contributes a specimen of Mexican cotton, grown in Washington from seed procured from

Durango, Mexico, which is a hybrid of *G. mexicanum* x *hirsutum*; lastly *Mr. Dewey 616*, which he names Hinganghat, comes very near to Molango and is *G. hirsutum* x *G. punctatum* var. *nigeria*.

Egypt. *W. Lawrence Balls 50* (Dec. 1906) said to be American Upland-Southern Hope, is more glabrous than in typical *G. hirsutum*. *C. 62*—"Cyprus II."—*G. hirsutum* is suggestive of some of the so-called Meko cottons: *C. 73*—*G. hirsutum* x *mexicanum* or *peruvianum*—known as Cambodia, seed obtained from C. P. Ind., grown in Egypt: *C. 81*—*G. hirsutum* hybrid x ? *punctatum*—known as "Webb," seed obtained from Texas: *C. 97*—*G. hirsutum* x *mexicanum*—known as "Nigeria Exotic," is suggestive of *G. punctatum*: *C. 98*—*G. hirsutum* x *mexicanum* or *punctatum* (almost glabrescent), flowers small, seed procured from Nyasaland: *C. 99*—"Bhuri"—*G. hirsutum* var.: *C. 119*—"American King I",—is *G. hirsutum* x *punctatum*—strongly *punctatum*; *C. 131*—"Durango," *G. hirsutum* x *mexicanum* x *G. punctatum*, is very like "Cluster cotton": *C. 132*—*G. hirsutum* x *peruvianum*; known in Egypt as "White Brazil": *C. 135*—*G. hirsutum* x *mexicanum* Russel Big Boll; has very large seeds, irregular, with grey-brown fuzz: *C. 285*—"Darwar II"—*G. hirsutum* Linn. (very near *C. 99*).

*C. 781*—*G. hirsutum* x *mexicanum*, "Amrit": *C. 788*—*G. hirsutum* x *mexicanum*, Gold Coast: *C. 796*—"Lightning Express," is *G. hirsutum* with suspicion of *G. punctatum*; seed Cocker's pedigree: *C. 797*—*G. hirsutum* x *mexicanum*—known as Dixie II; Cocker's Pedigree Seed: *C. 798*—*G. hirsutum* x hybrid? with *G. vitifolium*; (seed with grey-green fuzz); "Webber 49"; Cocker's Ped. Seed: *C. 800*—*G. hirsutum* x ? *mexicanum* or *purpurascens*—known as Cleveland III; Cocker's Ped. Seed: *C. 802*—*G. hirsutum* x *mexicanum*; "Mexican Big Boll VI," from Cocker's Pedigree Seed (leaves large, sinus deeply infolded; flowers large; bracteoles oblong, teeth few, coarse; seeds large coarse white-grey fuzz and good floss.): *C. 803*—*G. hirsutum* x *mexicanum*; named "Trice I 1/16"; Cocker's Pedigree Seed; is probably the same as *C. 131* and *C. 135*.

*C. 820*—*G. hirsutum* ? x *peruvianum*—known as Tendric No. 2 B (pilose form): *C. 825*—*G. hirsutum* x *mexicanum*—said to be "Nigeria Indigenous" (*826 B* is glabrous form, a hybrid? *mexicanum* x *hirsutum*); seed obtained from Empire Cotton Growing Committee, 1920: *C. 829*—*G. hirsutum* x *mexicanum*—known as Durango Cotton; *C. 830*—*G. hirsutum* x *mexicanum* known as Durango Cotton; *C. 831*—*G. hirsutum* (typical)—known as "Webber 49"; Cocker's Pedigree Seed: *C. 835*—*G. hirsutum* x *mexicanum* named "*G. hirsutum* v. *nankin*"—but no trace of *G. nanking* Meyen: *C. 836*—*G. hirsutum* x *mexicanum*, named "*G. hirsutum* v. *nankin*," no trace of *G. nanking* Meyen.

†5. Leaves small entire or 3-lobed, sinus shallow open, glabrous; petioles longer than the blades; glands of the veins absent; flower small yellow, tinged purple; seeds coarse, with rufous fuzz and dirty oily floss.

**Gossypium Birkinshawii** *Watt*, sp. nov.

*Planta* tota glabra; ramuli ascendentes, recti, subteretes, cortice saepe longitudinaliter fisso, punctis nigris in innovationibus conspicuis inferne inconspicuis; ramuli pedunculi petiolique purpurascentes. *Folia* ovata, cordata, acuta, integra vel 3-lobata, lobis latis triangularibus interdum acuminatis, sinibus apertis, glabra vel juvenilia supra breviter irregulariterque pilosa; nervi 3–5 eglandulosi; petiolus laminae aequalis, rotundatus, glaber, conspicue nigro-punctatus, demum verrucis atris elevatis tectus; *stipulae* parvae, lineari-lanceolatae, eae pedunculorum breves, latae, lunatae. *Flores* solitarii, ramulos breves unifoliatos axillares secus ramos dispositos terminantes. *Bracteolae* ovatae, apice profunde incisae dentibus lanceolato-subulatis, extra glandulis inconspicuis instructae, intus eglandulosae; pedicelli pedunculis multo breviores. *Calyx* dentibus quadratis abrupte minuteque apiculatis. *Petala* brevia, flava, purpureo-tincta, ultra bracteolas ¼ producta, extra breviter tomentosa. *Capsula* rotundata, acuminata, 4-locularis. *Semina* lana duplici vestita, breviore ("fuzz") pro rata longa dense rufo-villosa, longiore ("floss") sordida oleosa. *G. punctatum* Schum. et Thonn. var. *jamaica* Sprague in Kew Bull. 1914, p. 199, non Watt.

West Indies. Mr. Birkinshaw speaks of the plant as rather straggly and from 3½ to 5 feet in height. It was found (Jan. 15th 1915) growing wild on the cliffs about Billy Hole, near Point de Jour, Canouan, St. Vincent, West Indies (type).

This interesting wild species stands between *G. punctatum* Sch. et Thonn. var. *jamaica* and *G. mexicanum* Tod. but seems sufficiently distinct to justify specific rank. In the interest that attaches to the possible discovery of the great Short Staples of the United States it would appear desirable to set forth the features that separate this plant from its nearest allies.

Whole plant practically glabrous; the shoots ascending, straight, rounded, smooth but with the epidermis frequently splitting off in lines, thus causing the twigs here and there to appear angled, black epidermal glands very evident on the youngest parts, inconspicuous below, twigs, peduncles, and petioles purple tinted. *Leaves* ovate cordate acute, entire or 3-lobed, lobes broad triangular, sometimes becoming acuminate and with the sinus open, glabrous or with a very few short irregular hairs on the upper surface of young foliage: *veins* 3-5, glands of the veins absent: *petiole* equalling the blade, rounded, glabrous, dots abundant and conspicuous, becoming elevated black warts: *stipules* small linear-lanceolate, those on the peduncles short broad sickle-shaped. *Flowers* solitary terminating short, axillary shoots, bearing a single leaf, and produced all along the branches, not crowded near the extremities. *Bracteoles* ovate, deeply gashed on the apex into lanceolate-awl-shaped teeth, external glands inconspicuous internal absent: *pedicels* much shorter than the peduncles. *Calyx* cut

into square teeth, suddenly and minutely apiculate. *Petals* small, yellow, tinged purple, one quarter protruding beyond the bracteoles, shortly tomentose, externally. *Capsule* rotund, acuminate, 4-celled. *Seeds* coarse with shaggy long dense rufous *fuzz* and dirty oily *floss*.

†6. Leaves glabrescent, 3-lobed, lobes linear oblong, glands 1–3 on veins, petiole shorter than the blade : flowers fairly large turning purple ; bracteoles less than half the corolla : seeds large irregular densely coated with rufous fuzz and sparse short floss.

**Gossypium Harrisii** *Watt*, sp. nov.

*Folia* glabrescentia vel sparse stellato-pilosa, late ovata, 3-lobata ; lobi ovato-oblongi, acuminati ; glandulae infra nervos 1-3 ; petiolus lamina brevior, paullum alatus. *Flores* solitarii, ramulos breves axillares terminantes. *Bracteolae* dimidium corollae haud aequantes, ovato-oblongae, apice dentibus paucis longis irregularibus, vix cordatae, eglandulosae. *Calyx* magnus, laxus, truncatus, fructu accrescente fissus. *Petala* magna, purpurascentia vel purpureo-maculata. *Capsula* ovata, oblonga, rostrata, 4-locularis. *Semina* magna, irregularia, lana duplici vestita, breviore (" fuzz ") densa rufa, longiore (" floss ") sparsa brunneo-alba molli pro rata brevi.—*G. hirsutum* Fawc. et Rendle, Fl. Jam. v. 148 (1926), partim, non Linn.

West Indies. A wild plant found on " the coast line between Portland Point and Rocky Point, Jamaica." Collected by *W. Harris*, and identified in the Kew Bulletin (1914 p. 199) as *G. punctatum* var. *jamaica* (Flora Jamaicensis *10179*).

*Leaves* glabrescent or with a few stellate hairs, broad-ovate 3-lobed, lobes ovate-oblong acuminate 1–3 glands on the veins below, petiole shorter than the blade, slightly winged. *Flowers* solitary terminating short axillary spurs. *Bracteoles* less than half the corolla, ovate-oblong with a few long irregular teeth on the apex, cordature hardly visible and no glands present. *Calyx* large loose, cut square across and ruptured by the enlarging fruit. *Petals* fairly large turning purple or bearing small purple spots. *Capsules* ovate oblong tailed 4-celled. *Seeds* large irregular, densely coated with rufous fuzz and carrying sparingly a brown-white soft short floss.

In view of its being a wild species belonging very possibly to the *G. peruvianum* series I think it preferable to suggest a name for this plant. It can hardly be *G. punctatum* var. *jamaica*. Its closest affinity is with *G. Marie-Galante* Watt, sp. nov.

***Leaves tomentose or glabrescent entire or deeply segmented (three-fourths of the diameter or more) into 3–5 linear oblong lobes, which are generally constricted below and much narrower than long : petals in most species devoid of purple claws.*

† Leaves large, broad when young tomentose below half or three-quarters pinnately segmented into oblong mucronate lobes ; flowers very large, petals usually tomentose and drying into a greenish yellow tint ; calyx obscurely toothed : fruit 3-celled ; seeds large free and with a distinct though often only partially formed fuzz, green, grey or rust coloured with the floss copious and often silky.

**G. peruvianum** *Cav.* : Watt, l.c. pp. 164, 218–226, plates 37, 38.

South American, Peruvian (*Imbabura*) and Andes Cotton, also many of the Egyptian and African Cottons have to find places under this species.

A bushy perennial but cultivated as an annual and in that form mainly as hybrids. No collector records having found the plant in a purely wild condition, though not a few mention the existence of distinctive vernacular names as given to various forms of the plant such as *Owo* (Abbeokuta) ; *Okoko* (Congo) ; *Bazazulu* (Zambezi) ; *Soucho, Deti-tor* (Togoland) Togo Sea Island.

*Twigs* very long and flexuose, strongly angled striated, ash-coloured and often variegated, through the abundance of gland dots. *Leaves* large thick coarse, ovate-cordate often tomentose especially on the under-surface, (on the lower parts of the bush) the leaves are entire, (on the middle) pinnately segmented into 5, the central one long, (on the top) into 3 lobes, which are broad oblong, the three chief veins (or middle one only) usually carry glands and in certain hybrid forms the veins are web-footed at their junction with the petiole. *Nodes* thickened. *Stipules* large broad oblong. *Petioles* often two inches long and bear tufted hairs and prominent gland-dots. *Sinus* narrow and thrown up as a fold. *Inflorescence* elongated leafy shoots with solitary extra-axillary flowers. *Bracteoles* free from each other, large, cordate auriculate, embracing six distinct glands—3 inside and 3 outside—deeply incised, the central tooth prominent and longer than the others. *Flowers* large often tomentose externally. *Calyx* loose, obscurely toothed. *Corolla* sulphur yellow with purple claws. *Capsule* ovate-oblong suddenly acuminate, 3-valved scarcely protruding beyond the accrescent bracteoles. *Seeds* free, large with a distinct, though often imperfect, grey, rufous or green fuzz, below a copious silky wool.

A careful study of the very extensive and varied assortment of the plants that have to be thrown under *G. peruvianum* has convinced me that it may be helpful to endeavour to assort them under three separate headings such as :—

(A.) *G. peruvianum* var. *aegyptiacum* Watt, var. nov.

(B.) *G. peruvianum* var. *zaria* Watt, var. nov.

(C.) *G. peruvianum* var. *Irvingianum* Watt. var. nov.

The separation of (B) renders it easy to recognise the other two forms. The three varieties serve a distinct industrial purpose and simplify the recognition of the hybrids of the species.

**G. peruvianum** var. **aegyptiacum** *Watt*, var. nov.

*Ramuli* brunneo-virides, purpurascentes, profunde sulcati, copiose minute glanduloso-punctati. *Folia* tomentosa, tandem glabrescentia, tenuia, levia, lata, ovato-rotundata, cordata, sinibus in plicam elevatis ; lobi 3–5–7, oblongi, acuminati, marginibus inter sese obtegentibus ; lobus medius saepe 5 cm. latus petiolum aequans, glandula magna instructus, lobi 2 inferiores triangulares,

patentes, ceteri ascendentes, intermedii saepe glandula instructi ; nervi versus basin stellato-pilosi ; petiolus apice basique in glandulas constrictus, 7·5–12·5 cm. longus, sulcatus, prominenter glanduloso-punctatus ; stipulae lineares, circum petiolum curvatae. *Ramuli floriferi* 30–45 cm. longi, pedunculis 20–25 cm. longis, pedicellis 1–5 cm. longis, acute angulatis ; foliis parvis ovatis integris non cordatis raro 3-lobatis ; *stipulae* ramulorum floriferorum paullum lunatae, late obtusae, apiculatae. *Bracteolae* irregulares, ovato-oblongae, liberae, ad apices 8–12 (interdum 3–6)-dentatae, dentibus saepius subulatis copiose glanduloso-punctatis 3 mediis conjunctis, auriculatae, dimidio inferiore integro, glandulis nigricatis diffusis. *Calyx* magnus, laxus, cupularis, plerumque truncatus. *Petala* bracteolis paulo longiora, saepe purpurascentia. *Capsula* ovata, acuminata. *Semina* brunnea vel atra, obovata, indumento duplici vestita, breviore (" fuzz ") imperfecto vel alterutro vel ambobus extremis sito, longiore (" floss ") albo usque rubello laniformi.

*Twigs* brown-green shading to purple, deeply furrowed and copiously gland-dotted though dots minute. *Leaves* tomentose becoming (with maturity) glabrescent, large thin smooth, broad ovate-rotund, cordate, *sinuses* thrown up in a fold, lobes 3–5–7-oblong acuminate, with the margins overlapping and central one often 2 inches across, the three middle ones ascending, the central one as long as the petiole and carrying a large coarse gland (but often the laterals also have glands), lower pair of lobes triangular and thrown outwards. *Veins* stellately pilose near the base, petiole glandularly constricted at its base and apex (shrivelled and turning black in the herbarium) 3–5 inches long, furrowed and prominently gland-dotted, stipules linear curved and ascending around the petiole. *Flowering branchlets* 12 to 18 inches long, with the peduncles 8 to 10 and the pedicels ½ to 2 inches, sharply angled, the leaves small, ovate, entire, not cordate, rarely 3-lobed ; *stipules* slightly sickle-shaped, broad obtuse, thrown on one side and apiculate. *Bracteoles* irregularly drawn out, ovate-oblong, free, 8–12 (sometimes only 3–6)-toothed around the apex, the 3 central ones fused, teeth usually awl-shaped and strongly gland-dotted, auriculate, entire on lower half, embracing dark coloured diffuse glands. *Calyx* large loose cup-shaped usually cut square across. *Corolla* a little longer than the bracteoles often purple tinted. *Capsule* ovate acuminate. *Seeds* brown to black, obovate, with an imperfect fuzz around one or both extremities : *floss* white to reddish and woolly.

The cottons that fall into this position embrace most of the better known Stocks or Races of the so-called Egyptians. They are doubtless all hybrids and are cultivated plants, none of them so far having been recorded as found wild or even ferine, except the so-called Hindi Weeds of Egypt (see p. 353), which no doubt are recessive hybrids, some of them from this variety.

India. Calcutta, Royal Botanic Gardens (imported seed), *Watt 1734* from Ahmedabad, and *1814*, from Gondal.

Egypt. These have been drawn from the splendid collection made by the Botanical Section of the Ministry of Agriculture in Egypt, under the direction of Mr. N. D. Simpson. The specimens are examined in the sequence of the numbers assigned to them : where no observations are offered they may be accepted as representative of *G. peruvianum*, var. *aegyptiacum* :—

*C. 96*, "Massey's Cotton," (is a hybrid of var. *aegyptiacum* x *zaria*) : *C. 101*, "Balls' 310," (fuzz irregular, race ? ) : *C. 102*, "Pilion," (*aegyptiacum* with a strain of *vitifolium*) : *C. 103*, "New type of *Sakel*," (is typical *aegyptiacum*) : *C. 104*, (ditto) : *C. 105*, (ditto) : *C. 107*, "*Brittania*," (seeds large fuzz on both ends floss white good) : *C. 109*, "New Type derived from 95" : *C. 110*, "Contaroudi" (floss reddish white) : *C. 112*, "*Assili* from Korashia," (hybrid with teeth of bracteole numerous, awl-shaped) : *C. 113*, "Zagora," (hybrid of *aegyptiacum*, young foliage tomentose, suggestive of *Irvingianum* and *barbadense* with a strain of *pedatum* : *C. 116*, "New Voltos," (hybrid of *aegyptiacum* and *barbadense*, strongly the latter) : *C. 120*, "*Affifi*," (hybrid *aegyptiacum* and *barbadense*, foliage often sharply 3-lobed, floss reddish white) : *C. 121*, "Toudri," (hybrid of *aegyptiacum* x *zaria* or possibly *vitifolium*, upper leaves 3-lobed, seeds round with fuzz on both ends). *C. 122*, "Jannovitch, Domains," (hybrid of *G. peruvianum* var. *aegyptiacum* x *vitifolium* or *barbadense*, seeds rounded fuzz irregular, floss reddish tint) : *C. 125*, "*Abbassi*," (hybrid *G. peruvianum* var. *aegyptiacum* x *zaria*, lobes of the leaves becoming narrow and sharply pointed, floss white) : *C. 130*, "Migahid," (hybrid suggestive of *zaria*) : *C 133*, "Penia I," (seeds large fuzz at both ends) : *C. 271*, "Fittiadis," (hybrid of var. *aegyptiacum* x *pedatum*, is generally placed with *Affifi*, seed obtained from Behera Inspectorate in 1918 and reported to have been derived from Theodoroa Cotton, said to be not a fixed type) : *C. 780*, "Malta II," (is a hybrid of *aegyptiacum* x *pedatum*, veins of the larger leaves web-footed, auricles pedate, and seeds free, rounded, with a rufous tuft of fuzz and reddish tinted floss) : *C. 792*, "Yuma," (hybrid of *aegyptiacum*) : *C. 793*, "Gila," (hybrid of var. *aegyptiacum* x *pedatum*, larger leaves with the veins web-footed and auricle pedate, while the floss is remarkably good) : *C. 807*, "New Brown," (hybrid of *aegyptiacum* x *pedatum*, leaves large coarse with web-footed veins, fuzz white and at both ends of the free seed, floss good) : C. *808*, "Unnamed, from Fashn," (hybrid of var. *aegyptiacum* x *pedatum*) : *C. 809*, "Matamir Brown," (var. *aegyptiaca* x *vitifolum*, seed ovate with fuzz at both ends, floss poor, woolly) : *C. 816*, (=*Balls 111*) = *G. peruvianum* Cav. var. *aegyptiacum* hybrid x *mexicanum* x *pedatum*, (leaves faintly web-footed, fuzz at both ends slightly green tinted) : *C. 818*, "Nahdah, selected from *Assili*," *G. peruvianum* var. *aegyptiacum* x *pedatum* : *C. 819*, "Malaki Mumtaz," = *G. peruvianum* var. *aegyptiacum* with a strain of *zaria* x *pedatum* : *C. 822*, "Harland's Sea Island," = *G. peruvianum* Cav. var. *aegyptiacum* x *Irvingianum* and a strain of *G. barbadense* : *C. 823* (= *Balls 95*)

= *G. peruvianum* Cav. var. *aegyptiacum* x *mexicanum* x *barbadense*, (fuzz slight at both ends white) : *C. 837*, "Sakelaridis," = *G. peruvianum* var. x *pedatum* : *C. 842*, "Zagora, Upper Egyptian Cotton" = *G. peruvianum* var. *Irvingianum* x *barbadense* x *pedatum*, (leaves pilose, very slight web-footed, fuzz at both ends of the seed, imperfect, white, floss poor) : *C. 847*, "Maarad," = *G. peruvianum* Cav. var. *aegyptiacum* x *zaria* x *pedatum*.

**G. peruvianum** var. **zaria** *Watt*, var. nov.

*Frutex* saepe usque ad 3 m. altus, fere glaber, levis ; ramuli seniores teretes, juniores angulati, ut petioli nervique saturate purpurascentes. *Folia* oblonga, conspicue cordata, profunde acuteque in lobos 3–5 lineari-lanceolatos vel deltoideo-acuminatos incisa, lobo medio ceteris longiore glandula instructo, fere pilosa vel nervis petiolisque pilis paucis tantum instructis ; folia ramulorum floriferorum stellato-tomentosa, ovato-oblonga, non cordata, integra vel 2-lobata, petiolis gracillimis ; nervi basi membrana non connexi ; sinus acutus, in plicam non elevatus. *Ramuli floriferi* axillares pedunculis 2 vel pluribus, pedicellis brevibus crassis axillaribus acute angulatis. *Bracteolae* liberae, ovato-oblongae, subcordatae, glandulis intra sinus obscuris, fere glabrae ; dentes irregulares, deltoideo-acuminati vel caudati, interdum sparse hirsuti. *Calyx* laxus, cupularis, truncatus. *Petala* bracteolis duplo longiora, citrina unguibus purpureo-maculatis. *Capsula* ovato-oblonga, breviter rostrata, 3–4 locularis. *Semina* libera, ovata, atra, lana duplici vestita, breviore ("fuzz") e coma parva ferruginea circum rostrum constante, longiore ("floss") copiosa sordide alba fere sericea.

*Shrub* (often attaining a height of ten feet), almost glabrous and smooth, the older twigs round, the younger angled and like the petiole and veins are of a deep purple tint. *Leaves* of the flowering branchlets stellately tomentose and ovate-oblong, not cordate, entire or 2-lobed, borne on very slender petioles ; other leaves oblong, distinctly cordate, deeply and sharply incised into 3–5 linear-lanceolate to deltoid acuminate lobes, the central one the longest and carrying an obscure gland, almost pilose or simply with a few scattered hairs on the veins and petioles. *Veins* not web-footed. *Sinus* acute, not thrown up in a fold. *Inflorescence* axillary spurs with two or more peduncles and short thick axillary sharply angled pedicels. *Bracteoles* free, not very strongly cordate, contained glands obscure, almost glabrous, ovate-oblong, teeth irregular mostly deltoid acuminate or tailed sometimes carrying a few hairs. *Calyx* loose cup cut square across. *Petals* fully twice the length of the bracteoles, lemon-yellow with small purple blotches on the claws and becoming purple tinted. *Capsule* ovate-oblong shortly beaked 3–4-celled. *Seeds* free, ovate, black, naked except for the small rusty tuft of fuzz around the beak : *floss* abundant dull white almost silky.

This is possibly the source of some of the finer African and Egyptian Cottons such as most of the so-called *Abbassi*. I accept

it as a hybrid of *peruvianum* rather than of *barbadense* but it manifests a strong strain of *brasiliense*. I suggest a varietal name for it, since it seems fairly constant and is easily recognised. It doubtless is the plant which Dr. Irving (see below) thought might be *G. barbadense*.

Africa. Dr. E. G. Irving (Lond. Journ. Bot. vii, 1855) called it the *Owu* of the Yoruba, on the W. Coast; he tells us that there are two forms, the one having the leaves with "elongate lanceolate lobes" and there seems little doubt the plant in question was that here isolated as var. *zaria* which has thus been known and valued in Africa for many years. More recent collections are: *Mr. P. H. Lamb*, 7, November, 1912, which he speaks of as "The annual cotton in general cultivation around Zaria," Illorin, Northern Nigeria, (type): certain of the specimens named "*Ishan*" Cotton, contributed by the Director of Agriculture, Ibadan, Northern Nigeria, Dec., 1913: the *Ishan* and *Meko* cottons of to-day are doubtless two of the forms described by Dr. Irving seventy years ago: *W. H. Johnson*, Moçambique, 3, 16th Oct., 1906, "Flowers sulphur yellow with purple blotches"; he then speaks of it as "a cultivated race often called "Egyptian cotton": *J. Stocks*, Portuguese West Africa, *17* and *52*, Nov., 1907, "A cultivated bush ten feet high with stem four inches in diameter."

Egypt. Mr. Laurence Balls contributed a cotton, on the 8th Dec., 1906, which he appears to have regarded as *Abbassi*. In the *Wild* and *Cultivated Cottons* (page 224) that plant is alluded to as one of the Egyptian forms of *G. peruvianum*. That description may now be amplified by classing it as an example of var. *zaria*. But in Balls' specimens the twigs, petioles and veins, do not appear to assume the deep purple tint of more typical examples. Two other specimens, contributed by Mr. Balls, are obviously the same variety, but he speaks of them as being *Affifi*. The most obvious difference between these examples of *Abbassi* and *Affifi* would appear to be in the wool—pure white in the former and slightly tinted in the latter. Lastly Mr. Simpson sends me a plant known in Egypt as "Nigeria Indigenous" which may have to be accepted as a hybrid with a strain of *zaria*.

West Indies. *Small and Carter 8554*, Jan., 1910, from the Bahamas, near Deep Creek, Andros.

South America. Bolivia, *Britton* and *Rusby*, described by them as *G. maritimum*, *647*, 1890: Brazil, *B. G. C. Bolland* contributes a specimen with white fuzz and woolly floss.

India and Ceylon. A specimen collected in the Royal Botanic Gardens, Peradeniya, Ceylon and contributed by *C. F. Baker 116*, May 10th, 1907 (and which he named *G. barbadense*), seems to find its place rather under the *Abbassi* cottons and had better be accepted as *G. peruvianum* var. *zaria*. So again two sheets of a plant named *G. barbadense* in *Sir A. G. and Lady Bourne's* herbarium of Indian plants, *4807*, is doubtless the present form.

The Director of Agriculture of Northern Nigeria furnished a specimen which, in point of foliage etc., is *G. peruvianum* var. *zaria*, but the seeds are large, free, densely coated with rusty fuzz below an abundant soft white woolly floss, and the flowers purple tinted. It is spoken of as being " Brazilian Cotton " but is certainly not *G. brasiliense* and if it cannot find a place under *G. peruvianum* will very likely have to be carried to *G. microcarpum* Tod. —a much misunderstood plant. Mr. G. B. C. Bolland sends from Brazil a plant which matches exactly the Nigeria " Brazilian Cotton " except that it has an abundant floss and green coloured fuzz. The presence of a fuzz in both these plants might be viewed as bringing to mind some of the recessive manifestations of Egyptian cotton that are thrown into the ferine plant known as " Hindi Weed." (See p. 353).

**G. peruvianum** var. **Irvingianum** Watt, var. nov.

*Ramuli* teretes, purpurei. *Folia* fere glabra, late rotundata, basibus nervorum hirsutis ; novella subcordata, lamina saepe vix lobata ; adulta distincte cordata, majora pedata ad $\frac{2}{3}$ in lobos 2–3 (raro 5) divisa, lobo medio latissimo, auriculis lateraliter extensis interdum dentatis, in apicem acuminata, petiolo duplo longiora, nervo medio infra glandulifero ; sinus angustus, in plicam paullo elevatus ; nervi foliorum seniorum quasi compressi basi membrana conjuncti ; nervus medius infra glanduliferus. *Ramuli floriferi* axillares, 1–2-flori ; pedunculi angulati, petiolis multo longiores, 7–10 cm. longi ; pedicelli acute angulati, usque ad 2·5 cm. longi, glabri vel ad apicem sparse stellato-hirsuti ; folia ramulorum floriferorum indivisa, ovata, subcordata, stipulis hamatis saepe fimbriatis. *Bracteolae* corolla dimidio breviores, compressae, nunc hirsutae, nunc glabrescentes, late ovato-rotundatae, paullulo connatae, profunde dentatae, dentibus hamatis longitudine sensim accrescentes, glandula exteriore parva ovata. *Calyx* laxus dentibus brevibus rotundatis. *Petala* saepe magna citrina, purpurascentia, extra stellato-tomentosa. *Capsula* ovato-pyriformis vel lineari-oblonga, breviter rostrata, 3-locularis, reflexe dehiscens. *Semina* libera, magna, oblonga, atra, lana duplici vestita, breviore (" fuzz ") rufa circum rostrum breve sita, longiore (" floss ") copiosa laniformi sordide alba.

*Twigs* round smooth purple. *Leaves* almost glabrous, when young densely tomentose, and hirsute at the base of the nerves, broad rotund, young leaves faintly cordate and often almost reduced to the central lobe, older leaves distinctly cordate and becoming pedate, two-thirds segmented into 2–3 (rarely 5), lobes, the central one abnormally broad and with the auricles produced laterally (and sometimes toothed), acuminate to the apex, twice the length of the petiole : *sinus* narrow and slightly thrown up in a fold, older leaves web-footed (as in *G. pedatum*) that is to say a special fold of the epidermis is thrown across the axilla between the bases of the veins, and the veins look as if compressed or flattened out, central

vein carries a gland below. *Inflorescence* one- or two-flowered axillary spurs, consisting of a very long peduncle and a much shorter pedicel; peduncles much longer than the petioles (being 3–4 inches long), angled; pedicels acutely angled and less than one inch long, glabrous or with a few stellate hairs near the apex; leaves of the spurs entire ovate hardly cordate; stipules hooked and often fimbriate. *Bracteoles* compressed together, in some instances hirsute, in others glabrescent, broad ovate rotund very slightly attached together, deeply toothed and hooked around the margin, only one half the length of the corolla, teeth elongating as the flower matures, external gland small obovate. *Calyx* loose with short rounded teeth. *Petals* often very large, lemon-yellow, tinted purple, with outer surface stellately tomentose. *Capsule* ovate-pyriform to linear-oblong, shortly beaked, 3-celled, opening completely backwards. *Seeds* free, large oblong, black with a tuft of rusty fuzz around the short beak (in hybrid forms there may be a complete fuzz): *floss* abundant, woolly and dirty white.

This is the chief source of the *Owu* cotton of Dr. Irving who speaks of it as the "Common Cotton" of West Africa (in 1855) and in a like manner it embraces the chief examples of the *Ishan* and *Meko* cotton of to-day, and the Soucho or Deti-tor-Togoland.

West Indies & South America. Collected by *Frank Birkinshaw* n.? dated Jan. 11th, 1914, "Carriacou Marie Galante," Union Island, St. Vincent: Venezuela, Island of Margarita, collected by *Miller & Johnson 207*, 7th Jan., 1901: Bolivia, collected by *Britton & Rusby 647*, Yungas, 1890.

Tropical Africa, contributed by the Director of Agriculture, Ibadan, N. Nigeria, and named "*Ishan* cotton, *G. vitifolium*," Dec., 1913, a further sample named "Meko cotton," (seeds large coarsely covered with grey to green fuzz, has probably a strain of *G. mustelinum*): by *P. H. Lamb 6*, Nov., 1912, collected at Mawpa, Kabba, and described as "the annual cotton in general cultivation throughout Illorin and Kabba, seed covered with brown fuzz, lint of various tints sometimes rusty brown" and a further sample *17*, Feb., 1913, is described as "Bassa cotton (*G. barbadense*?)," seeds naked, lint white, collected at Ankpa (is strongly suggestive of *Lawrence Balls 56, C.2*): by *N. W. Thomas 305*, 1911, the *Owulu* cotton of Agolo, South Nigeria: *F. N. Howes 1095*, Gold Coast and Togoland.

Egypt. *Lawrence Balls 56, C.2*, (a hybrid close to the *Abbassi* cotton), seeds striped black, veins of the leaf compressed or flattened: *C.919*, "Malaki Mumtaz"—a selection from *Ashmouni*, seems a hybrid with *G. mustelinum* and which corresponds largely with the Bassa Cotton of N. Nigeria: *Lawrence Balls* "*Abbassi*" (1906), also "*Affifi*": *C.55* (= *Balls 77* is var. *Irvingianum* x *zaria* or *brasiliense* is spoken of as a "Brown Jannovitch"): *C.56* (= *Balls 95*): *C.90* "Nigeria Indigenous" = *G. peruvianum* var. *Irvingianum* x *zaria*.

India & Ceylon. By *C. F. Baker 116*, from Royal Botanic Gardens, Ceylon (is a hybrid of *G. peruvianum* var. *Irvingianum* x *zaria* or *G. brasiliense* and taken by the contributor to be *G. barbadense*).

Many of the plants thrown into this position are hybrids of *G. peruvianum* var. *aegyptiacum* x *G. punctatum* var. *nigeria*, some with, in addition, a strain of *G. pedatum*. Many of them approach *G. Marie-Galante* such, for example, as the Egyptian *C.828* and again others come near to Birkinshaw's "Carriacou Marie-Galante" of the Union Island.

In a note signed by C. O. Farquharson of the Agricultural Department, Ibadan, Nigeria, the *Ishan* and *Meko* cottons of that country are discussed collectively. They are spoken of as the "Native Cottons" and it is stated that the only difference between them is in the condition of the seed, fuzzy in *Meko* and black naked in the *Ishan*, that is to say fuzz confined to a rust coloured tuft around the beak. Some seventy years ago Dr. E. G. Irving studied the cottons of the Yoruba country on the West Coast of Africa. He sent his specimens and a report on the same to Kew and Sir William Hooker published it in the London Journal of Botany (vol. vii. 1855). The *Owu* cotton of Dr. Irving was doubtless the *Ishan-Meko* of to-day. Dr. Irving thought so highly of it that he presumed it might be *G. barbadense* Linn. But he tells us there were two or three forms, one with seeds black and clean, except for a small fawn or greenish-white tuft on one extremity; the second, fuzz covered; and the third intermediate or with an imperfect fuzz. Accordingly he suggested that experiments might be conducted to ascertain whether these plants came up from seed true to type. He then asks: "Are all the different varieties of seed given above ever found on the same plant? The few observations I have made, since asking myself this question, incline me to answer in the negative and I have hitherto found only clean black seeds on one bush, fuzz covered seeds on another. Are there any marked differences in the habit, form of leaves, etc., of plants producing these different seeds? I believe I can readily distinguish the black naked-seeded plant by its greater coarseness of stalk and leaf, the darker colour of the latter, and its more elongate lanceolate lobes." These are the very features that would seem to isolate the *Ishan* from the *Meko* cottons and to establish the variety *zaria*. It is thus somewhat remarkable that we are confronted to-day with the self-same problem viz., whether or not the presence or absence of fuzz marks recognisable forms of this species.

*G. peruvianum* Cav. belongs to a group of Gossypia that possess a well marked fuzz (such as *G. hirsutum* and *G. mexicanum*), but by hybridisation the fuzz frequently breaks down and is reduced to a tuft around the beak. In the case of *G. peruvianum* it serves a useful purpose to recognise, as already suggested, at least three varieties: (a) *aegyptiacum*, (b) *zaria* and (c) *Irvingianum*. But hybrids

between these varieties are frequent and, in recessive manifestations, the tendency seems ever present to throw back to the fuzzy seed. Still I think Irving's observation quite correct, viz., " I have hitherto found only clean black seeds on one bush and fuzz covered seeds on another." He separated unmistakably the naked seeded form with its dark purple twigs and narrow pointed leaf lobes, one of Africa's most interesting cottons. In fact the attempt to trace out the possible evolution or progression of the African forms of *G. peruvianum* may prove to be very much the history of the Egyptian Cottons of to-day, if indeed it be not the story of the formation of what might be described as the hybrid species *G. peruvianum* itself, a plant far more closely associated with Africa than Peru.

While examining hybrids of *G. peruvianum* the following circumstances may be borne in mind : the hirsute forms met with having fuzzy seeds and leaves with broad elliptic radiating lobes, are hybrids with *G. punctatum* and *G. hirsutum*, and those with glandular hairs are traceable to *G. mustelinum* : glabrous (or glabrescent) forms with fuzzy seeds are due to *G. mexicanum* influence; while glabrous forms with naked seeds and the lobes of the leaves sharp, narrow, linear-lanceolate acuminate, indicate *G. brasiliense, G. purpurascens* and *G. pedatum* : lastly, hybrids with soft pilose foliage, the lobes of the leaves ascending and the seeds often completely naked, denote possible hybridisation with *G. vitifolium* and *G. barbadense*—the most highly valued forms of Egyptian Cottons.

†2. Leaves pilose, almost split into 3–5 linear cuneate lobes, base hardly cordate, petiole about equal in length to the blade (stipules and scars not conspicuous) ; flowers fairly large ; fuzz rust coloured.

**G. Schottii** *Watt*, l.c. 206–09, plate 35.

This plant mostly appears as a recessive hybrid in fields of other stocks. Mr. Simpson speaks of it in Egypt as being " Union Cotton " and tells us that it appeared as a weed in South Africa, near Rustenberg, and that it was collected by Mr. Lugard of the Royal Agricultural Society of Egypt. It has the habit of appearing when least expected ; hence its being found in the Royal Botanic Gardens, Calcutta.

The type of the species was collected by Schott in Yucatan, and subsequently we learn of its having appeared in the U.S.A. as a weed in fields of " Kings Improved." It would thus seem possible that it may have been one of the stocks from which had originated the American large coarse seeded forms with irregular dense rufous fuzz.

The Egyptian grown example (*C.846*) is almost glabrous, has the twigs deeply furrowed and the leaves large much segmented almost pedatifid, with the central lobe often prominently toothed on one or both sides, has the lateral veins arching upwards and uniting some distance within the margin, while one (or sometimes even two) small glands appear on the central nerve below and

occasionally one on one or both of the laterals. The flowers are a little larger than the deeply gashed bracteoles, yellow tinged with purple, but claw not blotched. The capsules are ovate-oblong shortly beaked. Seeds large coarse, blunt at both extremities, fuzz coarse woolly grey or dirty greenish white, floss softly woolly about $\frac{3}{4}$ inch long.

**** Leaves very broad, quite glabrous (except when young or on the veins) segmented for hardly more than one-third the diameter into 3 7 radiating lobes (the lower pair often teeth rather than lobes), lobes triangular, much broader than long.*

† Flowers small on short deflexed pedicels (usually pale yellow coloured) capsule mostly 5-celled ; seeds with a complete (or only partial) grey white fuzz.

**G. mexicanum** *Tod.* : Watt, l.c. pp. 226–44, plates 39, 40 & 41. This species exists mostly in hybrids. The more frequent forms show some degree of influence from *G. hirsutum* or *G. punctatum*, less frequently from *G. peruvianum*, *G. vitifolium* and *G. pedatum*. It is the so-called Mexican Cotton or Upland American.

*Leaves* very broad smooth quite glabrous (except when young or on the veins), entire or segmented on the apex, for hardly more than one-third the diameter, into 3–7 radiating lobes, with the veins arching upwards from the base (the lower pair of lobes rather teeth than lobes), lobes triangular much broader than long, glands one to three on the veins below. *Flowers* small, usually pale yellow and almost completely embraced by the bracteoles, peduncles short. *Capsule* mostly 4–5 celled. *Seeds* with a complete dense grey (sometimes partial) fuzz, floss usually white and silky.

No botanist has recorded the existence of this plant in a wild or even ferine state. It is a cultivated plant, and as already observed, exists in hybrid conditions.

Siam : Banson, "*C.*, Aug. 11th, 1926, cultivated" *Dr. Kerr 4229* (described as "American Upland"). Sierra Leone (vern. name *Inande*), *468*, Feb., 1923. Yunnan : *Forest 11554.*

Egypt—an extensive assortment, some from Egyptian old stocks, others said to be raised from seed procured recently from the U.S.A., so that they may be accepted as representative of certain American cottons. They have been taken up in the sequence assigned to them by the Egyptian authorities :—

*C.95*—"Acala," seed obtained from Texas (strongly suggestive of hybridisation with *punctatum*) : *C.114*—"Red Leaf," (suggestive of Willet's Red") grown at Giza in 1922 (whole plant tinted with purple, flowers small deep purple flushing) : *C.117*—"Wrinkled Leaf," raised from seed procured from Fashn (leaves generally toothed on the apex, or shortly lobed, 5–7 radiating nerves, epidermis transversely corrugated, bracteoles rotund bearing 12–15 teeth round the apex, flowers large yellow with small blotches on the claws, seeds short, broad-ovate, brown with grey tuft of fuzz around the beak ; might be worthy of a varietal name and I suggest

var. **rugatum**, var. nov.) : *C.136*—" Lone Star I," suggestive of influence from *purpurascens* : *C.137*—" Express 350," is possibly *mexicanum* x *hirsutum* : *C.138*—" Foster II," is strongly suggestive of *Birkinshawii* influence : *C.287*—" Triumph," seed procured from the U.S.A. and grown at Giza in 1921 (leaves blotched with purple and white ; seed large with grey fuzz), *mexicanum* x *hirsutum* hybrid : *C.288*—" Truitt," seed procured from the U.S.A. and grown at Giza in 1923 (leaves blotched with purple ; flowers small purple tinted, fuzz coarse grey, floss good white) : *C.782*—" White Brazil," suggestive of Truitt Cotton (flowers large yellow ; seeds large with a coarse dense grey fuzz ; gland dots of the leaf-stalk minute) : *C.784*—" Russel II.A," seems a hybrid of *mexicanum* x *peruvianum* (leaves large, the auricles very nearly becoming pedate, flowers almost clustered, large tinted purple ; seeds coarse, fuzz grey brown, floss poor) : *C.785*—" Lone Star II," hybrid *mexicanum* x *hirsutum* (margin of the leaf-lobes blotched purple, seeds small ovate grey fuzz and poor floss) : *C.786*—" Rowden van Zanott," hybrid *G. mexicanum* x *hirsutum* (twigs etc., green-brown, seeds oblong and with a coarse white fuzz) : *C.789*—" Abyssinian I," very nearly pure *G. mexicanum* (leaves with 3–5 short lobes on the apex and sometimes an extra tooth, flowers small, pale yellow) : *C.790*—" Abyssinian II " (stems etc., greenish purple, flowers large and purple tinted, seeds ovate with scanty grey fuzz and poor floss) : *C.799*—" Hartsville No. 19 " (twigs etc., green, flowers purple tinted, seeds with coarse green fuzz, and good floss. May possibly have a strain of *G. peruvianum*) : *C.801*—" Foster III," hybrid *mexicanum* x *hirsutum* or *peruvianum* (flowers small purple tinted, seeds coarse with dense coat of grey fuzz) : *C.804*—" Salisburg," Cocker's pedigree (flowers large purple tinted, seeds small ovate, grey fuzz, leaves often with extra tooth) : *C.805*—" Dixie Triumph " (twigs etc., purple green, flowers small purple, tinted with grey, and poor floss), is a hybrid of *mexicanum* x *hirsutum* and comes near to *C.287* : *C.806*—" Council Tooll," hybrid *mexicanum* x *hirsutum* or *peruvianum* (twigs green purple ; flowers small purple tinted ; seeds obovate brown-grey floss short) : *C.815*—" Webber Delta Type III," a hybrid *G. mexicanum* x *hirsutum* (flowers small yellow) : *C.821*—" Tendick No. 2," seeds obtained from the Nubar Mountains (leaves uniform cordate, lobes very short and often toothed on lower margin and with a conspicuous black glandular patch at the junction of the nerves with the petiole ; bracteoles hardly cordate, central tooth greatly elongate hooked, protruding beyond the pale yellow corolla), slightly hybridised with *hirsutum* : *C.826*—" said to be " Nigeria Indigenous," raised from seed obtained from the Empire Growing Cotton Committee 1920, hybrid with *hirsutum* (seeds large coarse, dense grey fuzz, good white floss) : *C.832*—" Cleveland IV," seed obtained from Cocker's Ped. Seed Company, Hartsville, U.S.A. (floral leaves 3-lobed, flowers purple tinted, seeds coarse cylindric dense grey fuzz, floss short pure white silky) : *C.833*—" Cleveland I $\frac{1}{16}$," hybrid ? *peruvianum* from Cocker's seed as above (flowers

purple tinted) : *C.834*—" Cleveland I ½," from Cocker's seed as above (seeds coarse with dense grey fuzz and poor floss) : *C.848* – " Tangale No. I," Nubar Mountains, Sudan, almost pure *mexicanum* (twigs green-purple dotted, leaves purple tinted) : *C.849*—" Trinidad Native I," hybrid x *peruvianum* (twigs dark purple) : *C.850* – " Trinidad Native II," hybrid with *peruvianum* (leaves rotund lobes round deltoid tailed) : *C.851*—" Trinidad III," *mexicanum* x *peruvianum*, might possibly be x *pedatum* (twigs etc., dark purple, leaves with 5 short broad lobes and sinuses on either side of central lobe thrown up in deep folds, margin slightly purple tinted and with occasional teeth, auricles becoming pedate).

Section IV. Naked-Seeded Cottons (Irregular and Partial Fuzz in certain Hybrid Forms of G. pedatum), with the Bracteoles Free or nearly so and Contained Glands usually conspicuous.

*Bracteoles* only slightly united below or free ; possessed of large conspicuous external glands within the auricles and often also between the bracteoles and the calyx. *Seeds* naked or nearly so and floss easily removable. *Leaves* often very large, mostly glabrous.

There are both Old and New World forms in this section, but only one, so far as at present known, has been met with in what appears a truly wild condition, and that species might be spoken of as Polynesian. Two others have been occasionally seen either as wild plants or as escapes from cultivation, namely *G. brasiliense* and *G. vitifolium*.

* *Twigs strongly angled, glabrous and purple coloured ; leaves ovate faintly cordate, entire or three-lobed across the apex ; flowers small, only slightly exceeding the bracteoles ; petals yellow tinged with purple.*

**G. purpurascens** *Poir.* ; Watt, l.c. pp. 250–5 plate 44.

Bourbon and Porto Rico Cottons : (a cultivated state of the Polynesian *G. taitense* Parl). It is often described as " Red Siam Cotton," the form from which Nanking was originally made.

*Twigs* angled, purplish, subglabrous glaucous. *Leaves* small and for the most part having 3 lobes, the laterals of which point outwards and upwards, glands one on the middle vein near the bottom. *Bracteoles* sub-rotund deeply gashed and peduncles terminated in 3 small glands within the auricles of the bracteoles. *Calyx* large loose, truncate or shortly toothed but never tailed, teeth 3-veined. *Petals* small slightly exceeding the bracteoles, yellow tinted purple. *Capsule* oblong acuminate 3–4 celled. *Seeds* rounded smooth (not angled) large and nearly naked though true wool copious, silky and easily separable.

*Dr. Kerr* sends a specimen (*13*) from Siam which seems possibly hybridised with *G. mexicanum*, he speaks of it as a straggling shrub. It is also fairly frequently met with in S. India (usually ferine) as for example *Sir A. G. Bourne 5160*. Although met with in Africa it is much less frequent in that country than in India, Siam and

China. There is no record of any systematic (commercial) cultivation in any country though its close association with *G. mexicanum* makes it of special interest.

** *Twigs angled smooth glabrous: leaves thick, ovate-oblong,* 2–3 (*rarely* 5) *lobed, deeply cordate auriculate, the* 3 *central veins ascending, central lobe long and broad, petiole angled and hirsute at its junction with the veins; flowers small lemon coloured, bracteoles irregular coarsely toothed; calyx accrescent; seeds naked black, floss easily separable, silky.*

**Gossypium Marie-Galante** *Watt,* sp. nov.

*Ramuli* adulti angulati, leves, glabri, minute glanduloso-punctati. *Folia* crassa, levia, ovato-oblonga, 2–3- (raro 5) lobata, profunde cordato-auriculata, subtus secus nervos et in eorum axillis hirsuta; lobi sinus acutos obtegentes, elliptico-deltoidei, acuminati, seta terminati; lobus medius ceteris longior latiorque ita ut lamina petiolo angulato longior; nervus medius infra glandulosus, nervi 2 intermedii ascendentes, nervi 2 exteriores patentes. *Ramuli floriferi* axillares, breves, 1–2-flori; pedunculus 5 cm. longus; pedicelli vix 2·5 cm. longi. *Braceteolae* leves, membranaceae, glabrae, ovato-oblongae, liberae, ad apicem profunde grosseque incisae 3–5 dentibus late linearibus acutis prominenter nervosis. *Calyx* laxus, truncatus, demum accrescens patulus. *Petala* parva paullulo bracteolas excedentia, pallide flava. *Capsula* pyriformis, breviter rostratus, 3-locularis. *Semina* parva, curvata, elliptica, atra, breviter rostrata, lana duplici vestita, breviore ("fuzz") brevissima rufa circum rostrum sita, longiore ("floss") mollissima sericea faciliter detergibili.

West Indies. Collected by *Frank Birkinshaw* (type), January 11th, 1914, in Union Island, St. Vincent, West Indies; Found by *Mrs. Rev. J. J. Ricksecker* in St. Croix, Danish West Indies, *62*, January 28th, 1897.

Mature *twigs* angled smooth glabrous carrying minute gland dots. *Leaves* thick smooth, ovate-oblong, 2–3– (rarely 5) lobed, deeply cordate auriculate, lobes overlapping the acute sinus, elliptic-deltoid acuminate bristle tipped, the central lobe the longest and broadest making the blade longer than the petiole, which is angled, hirsute at the junction of the veins and along the veins; the three central veins ascending, the bottom pair imperfect and spreading, gland present below, on the central vein. *Flowering branchlets* axillary short, one to two flowered; peduncles two inches long, pedicels hardly half that length. *Bracteoles* smooth membranaceous glabrous ovate-oblong, free, deeply and coarsely gashed on the upper half into 3–5 broad linear acute and prominently veined teeth. *Calyx* loose truncate becoming accrescent and spreading. *Petals* small hardly exceeding the bracteoles, pale yellow. *Capsule* pyriform, shortly beaked 3-celled. *Seeds* small bent elliptic, black, with a short beak, almost devoid of fuzz, but having a very short imperfect rufous tuft around the beak; *floss* easily separable, very soft silky small in quantity but of good quality.

" Silk Cotton Marie-Galante " of Union Island, St. Vincent, W. Indies.

An interesting plant with small lemon coloured flowers, irregular coarsely toothed bracteoles, large much accrescent sepals and naked black seeds with easily separable silky floss. In some respects it recalls *G. Birkinshawii* but with the young foliage and petioles almost stellately pilose, especially on the veins below. It approaches *G. punctatum* var. *nigeria* hence comes near to *G. hirsutum* (except that the seeds are naked). So also it approaches in structure of the bracteoles and nature of the floss *G. Harrisii*. In fact it might easily have contributed towards the formation of *G. barbadense*.

A cotton grown in Egypt and described as *Bamia* (*C.828*) might be accepted as a cultivated hybrid of this plant, except that it has a more distinct fuzz and poor floss. So also Mr. N. D. Simpson's Egyptian plant, which he calls " Ashmouni," (*C.124*) and which at first I took to be a hybrid of *G. peruvianum* x *vitifolium*, might after all prove a cultivated state of the West Indies plant *G. Marie-Galante*.

**** Twigs faintly angled on the young growing parts and pedicels, green or brown coloured ; leaves ovate-oblong, more or less cordate, entire or 3–5 deeply palmately lobed ; flowers large, nearly twice the length of bracteoles or more, petals pure yellow but with conspicuous purple claws.*

† Leaves pilose-tomentose below, lobes somewhat irregular but more or less ascending, broad, usually only 3, and the central one often much longer than the laterals ; flowers frequently three times the length of bracteoles, and the fruit 3–4, (often 5) celled ; seeds free brown, glabrous.

**G. vitifolium** *Lamk.* ; Watt, l.c. pp. 245, 255–65, plate 45.

The Vine Leaved Cotton.

Stem perennial, often bent and twisted ; *twigs* more or less angled. *Leaves* thin, soft, pilose-tomentose below, especially at the base, ovate-oblong, sub-cordate, entire or 3- (rarely 5) deeply palmately lobed, the lobes somewhat irregular but with a pronounced tendency to be ascending, broad, the central one often very much the longer. *Inflorescence* axillary shoots with long peduncles bearing one or a few flowers and small though normal leaves. *Bracteoles* free or only slightly united but possessed of large external glands. *Calyx* large truncate many veined ciliate. *Petals* often very large, frequently three times the length of the bracteoles. *Capsule* 3–5-celled, ovate-rotund embraced by the accrescent bracteoles. *Seeds* free, brown-black naked or nearly so though in hybrid forms sometimes with an imperfect fuzz.

Very possibly a native of Central and South America and of the Lesser Antilles ; widely distributed by cultivation. Indeed it would seem highly probable that it is the primary stock from which may have been evolved all the finer hybrid long staple cottons. It has been spoken of, by some observers, as having been seen in a wild state but perhaps ferine rather than indigenous. In cultivation it never exists pure but merges, on the one side, into *G. peruvianum* and its associates, or on the other into *G. barbadense* and

*G. brasiliense.* A distinctly cordate base of the leaf, in association with a fuzzy seed, indicates the former tendency, while sharply cut glabrous foliage, having oblong-linear acuminate lobes, denotes the latter.

The following examples may be accepted as approaching the specific type in foliage, though the seeds have a pronounced tuft if not a complete though coarse fuzz. Certain samples of " Ishan Native Cotton " received from the Director of Agriculture, Ibadan, N. Nigeria, dated December, 1913, and 18th November, 1914, also a specimen from the same contributor but described as " Meko Native Cotton " : *Whitford and Hutchison 9147,* Philippines, Nov., Dec., 1907.

Hybrid Forms—*Dr. Parnell's* Jamaica plant collected in 1840, *G. vitifolium* x *peruvianum* ; *Mr. C. B. Robinson's 494* from Amboina —perhaps a hybrid of *G. vitifolium* x *peruvianum* ; Madagascar, *Scott Elliot 2103* and possibly also Western Mexico, *Frank H. Lamb 448*—the last two being possibly *G. vitifolium* x *hirsutum.*

†2. Leaves very nearly glabrous, half or more segmented into 3–5 spreading oblong acuminate lobes ; flowers hardly more than twice the bracteoles, and fruit 3–4- (mostly 3) valved ; seeds free, brown, almost glabrous.

**G. barbadense** *Linn.* ; Watt, l.c. pp. 245, 265-85, plates 46, 47 and 48.

The Sea Island Cotton of the West Indies : the Long Staple Cotton of the U.S.A. : and possibly the Gallini and Jannovitch Cottons of Egypt.

A perennial shrub cultivated as an annual. *Twigs* slender, round, smooth, glabrous or nearly so, of a greenish-purple tinge, and faintly gland dotted. *Leaves* smooth, compact (in texture), pale green, glabrous except on the petiole, veins and under surface of young foliage half or more segmented into 3–5 spreading oblong acuminate lobes, the centre one not materially longer than the others (an eye-mark in the separation of *G. peruvianum*). *Flowers* hardly more than twice the bracteoles, peduncles usually shorter than the petioles, rigid and strongly angled. *Bracteoles* free, ciliate and eglandular. *Capsule* ovate, beaked, mostly 3-celled. Seeds free, brown, ovate, beaked, almost quite naked of fuzz but with a long silky white and readily separable floss.

*Stems* and branches slender rigid smooth round (angled while young), greenish-blue, not prominently gland dotted, except on the petioles, nodes thickened so as to appear to embrace the peduncles and petioles. *Leaves,* in texture, smooth, almost quite glabrous ; *upper ones* reduced to the central lobe or 3-lobed, cordate ; *lower leaves* with the sinus (between the lobes) thrown up in a fold, half or more segmented into 2, 3 to 5 lobes, the lobes oblong-deltoid acuminate bristle tipped, the central one not much exceeding the laterals but bearing a distinct gland (sometimes the laterals carry glands also), veins, in typical examples, not web-footed (a character of *G. pedatum* that now and again becomes manifest in certain

hybrids of *G. barbadense* and *G. peruvianum*), petioles longer than the peduncles which are rigidly angled and petioles faintly winged near the apex ; floral *stipules* small linear caducous. *Inflorescence* axillary, solitary on special leafy shoots that become much elongated and carry large broad oblique, obtuse stipules ; *pedicel* one inch long, strongly angled and more or less winged, often thrown into an extra-axillary position, almost opposite the leaf, but does not carry distinct glands within the cordature of the bracteoles. *Bracteoles* usually quite free, relatively small, cordature not pronounced, glabrate with prominent parallel veins and reticulations, ovate-rotund and having 5–10 coarse irregular teeth the central one usually 3-nerved. *Calyx* wide campanulate, crenate or entire, many veined and with rows of prominent gland dots between. *Petals* not quite twice the bracteoles (occasionally large), ciliate, pale yellow with purple tinge and often with a large purple spot on the claws. *Capsule* ovate-acuminate mostly 3- (more rarely 4) valved. *Seeds* 6–9 in each cell, ovate beaked smooth brown-black, free almost quite naked ; *floss* long, fine, silky and easily separable from the seed.

The type of the species was described as " an annual cotton with 3-lobed leaves " but it may be said that the tendency to become quite glabrous and to have large broad deeply cordate leaves, with 5-spreading lobes, marks the advance from *G. vitifolium* through *G. barbadense* to the variety distinguished as *maritimum*. The type of *barbadense* is seen on plate n. 46A (Watt l.c.) and the variety on plate n. 47. But it may be questioned how far the variety can be upheld botanically. All the better qualities of *G. barbadense* are variety *maritimum*. There are no definite features that can be singled out as separating the variety, and what is more, both are unstable hybrids that change rapidly under favourable or unfavourable environment.

In the *Wild and Cultivated Cottons* (pp. 275–294, plates 47 and 48) I endeavoured to separate the variety but it was more the commercial fibre than the botanical form. Since then the world's stock has deteriorated and the cultivation been threatened by the spread of the boll-weevil. The story that has now to be told is one of failure, except perhaps within the narrow limits of its insular production. The Sea Island Cotton proper is a glabrous annual with spreading branches and large, broad, deeply 3–5-lobed, cordate leaves, and with an ovate, 3-celled capsule which opens freely and exposes naked free seeds which carry a long floss (1½ to 2½ inches) of a somewhat creamy colour but very fine strong and silky, superior in fact to all other cottons.

Though commonly affirmed to be a native of the West Indies there is no direct evidence in support of that opinion. Richard Ligon (History of Barbados, 1657) makes no mention of it. The botanical specific name *barbadense* was founded by Linnaeus on the description and plate given by Pluckenet (who lived from

1642-1706) " an annual cotton with 3-lobed leaves, met with in Barbados " was his account of it. It is not, therefore, separable from *G. vitifolium* or even from *G. peruvianum*. Pluckenet's actual specimen, is, however, preserved in the British Museum and it, therefore, is the absolute type of the species. There is no specimen of it in the Linnean herbarium though two plants in Linnaeus' handwriting are named *G. barbadense* but these are *G. obtusifolium* and *G. herbaceum* and both show 5-lobed leaves and have little or no resemblance to Pluckenet's *G. barbadense*. The plant is, however, so closely associated with *G. vitifolium* as to suggest its indigenous habitat being somewhere in South America, not in the West Indies. But it is fairly certain that the modern stock is a hybrid. The plant, as originally produced in North America (according to Wright) was intermediate between the Pernambuco (*G. brasiliense*) and the Barbados or Bourbon cottons. The precipitate expansion of its cultivation in the United States, Egypt and elsewhere, would seem to have been in defiance of the requirements of the plant. The failure which has ensued might have been anticipated, for even the spread of the boll-weevil no doubt, to some extent, is a consequence of the unsuitability of the plant to its new environment. The acclimatisation of special stocks (more especially hybrids) to new areas is ever a risky undertaking. It is preferable, in each country, to attempt the production (or evolution) of its own new stocks. No more telling illustration of this fact could be given than the story of the enlightened endeavour, made by the Egyptian Government, to extend and improve its cotton production. Seeds had been procured from a great many cotton growing countries and these were experimentally grown at the Giza Cotton Farm. The enumeration presently to be given sets forth some of the endeavours that were made with *G. barbadense*—more especially the Sea Island Cottons—both were imported and indigenous (or perhaps rather long acclimatised) stocks. Degeneration rapidly ensued with nearly all the recently imported plants. The most striking retrogressions were found to be toward *G. peruvianum* one of the varieties of which, from its close association with Egypt, I have given the varietal name of *aegyptiacum*. But in addition to the demonstration of *G. peruvianum* as an element in the composition of several Sea Island Cottons, the manifestation of *G. pedatum* in others is very striking, such for example as the *Olga*, the *White Jannovitch*, the *Garofallon*, the *Gallinos*, and the *Fathi* cottons which were shown to be hybrids of *G. barbadense* that tend to revert to *G. pedatum*.

The following examples of the species *G. barbadense* or of hybrids with a strain of that species and also of *G. vitifolium* may be specially mentioned :—

Egypt. The specimens may be discussed in sequence of the numbers assigned to them in the Egyptian cotton herbarium ; *C. 77* " Superfine Sea Island," (seeds coarse brown-black with tuft of fuzz at both extremities, leaves almost glabrous, veins web-

footed at the base, upper leaves not cordate—a hybrid of *barbadense* with *G. peruvianum* var. *Irvingianum* x *pedatum*) : *C. 87*—" Nubari " : *C. 88*—" Sea Island Cotton " : *C. 89*—" Sea Island " : *C. 100*—" Casulli " (perhaps a hybrid with *G. peruvianum*) : *C. 106*—" New type from *Balls 77*," (a hybrid with *G. peruvianum*) : *C. 118*—" Enan's Brown " (hybrid with *G. peruvianum* var. ?) : *C. 123*—" Fathi " (a hybrid of *G. peruvianum* var. *aegyptiacum* x *G. vitifolium*) : *C. 126*—" Nyam-Nyam " (a hybrid very close to *C. 123*) : *C. 127*—" *Balls 111* " (a hybrid of var. *aegyptiacum* x *vitifolium*) : *C. 134* " Montserrat Sea Island " (almost typical *G. barbadense*) : *C. 139* — " St Kitt's Sea Island " (a hybrid with *peruvianum*—early foliage hirsute, bracteoles many toothed) : *C. 270*—" Olga Cotton " (a hybrid with a strain of *G. pedatum*—fruit linear-oblong, leaves often pale coloured on the margin and veins prominent—is spoken of as being of the *Abbassi* type) : *C. 274* –" White Jannovitch " (is a hybrid of *G. peruvianum* x *G. barbadense* with a strain of *G. pedatum*, comes very near to *C. 270* O'ga Cotton, and like that form shows strongly the marbling of the foliage) : *C. 279*—" Garofallon " (a hybrid of *G. barbadense* with possibly *G. hirsutum* and *G. pedatum*—approaches the *Sakel* Cottons) : *C. 281*—" Gallinos Cotton " (comes near to the Garofallon and is a hybrid of *G. barbadense* x *peruvianum* with a possible strain of *G. pedatum*) : *C. 282*—" Fathi Cotton " (is a hybrid of *G. peruvianum* x *barbadense* with a strain of *G. pedatum* —hence the coarse foliage (on the upper surface) with raised and infolded veins—is quite different from *C. 123*, which is also named *Fathi*—, is probably near to *Ashmouni* Cotton) : *C. 286*—" Charleston Sea Island," as grown in Egypt (seed obtained from Carolina in 1921, is a hybrid with *G. peruvianum*.)

†3. Leaves large coarse quite glabrous (except a few hairs on the veins below) 3–7-lobed (and sometimes also toothed), the lower pair pedate and overlapping the petiole, veins imperfectly winged and web-footed, they also carry 1–3 glands below and the veins and reticulations are prominent ; bracteoles very large deeply gashed fully half the length of the corolla ; seeds free black or with an imperfect easily separated fuzz which may be reduced to a rufous tuft.

**Gossypium pedatum** *Watt*, sp. nov.

*Ramuli* teretes vel inconspicue angulati, glabri, minute glanduloso-punctati, brunnei, purpurascentes. *Cotyledones* transverse ellipticae longitudine duplo latiores, nervis 3–5 alatis alis in petiolum decurrentibus. *Folia inferiora* late ovata, breviter cordata, acuminata, 3–5-nervia. *Folia intermedia* trilobata, cordata, lobo medio lateralibus multo longiore. *Folia superiora* pedatim 5–7-loba, lobis interdum conspicue dentatis, extimis petiolo parallelis, 20–25 cm. longa, 25–37·5 cm. lata, nervis imperfecte alatis basi membrana connexis, 1 vel 3 eorum glandulam linearem gerentibus, auriculata, auriculis foliorum majorum petiolum obtegentibus, matura glabra nervis subtus sparse stellato-pilosis exceptis ; petiolus alis nervorum decurrentibus elevato-lineatus, 2·5–12·5 cm. longus. *Ramuli floriferi* axillares, 2–3-flori ; stipulae latae deflexae, interdum

dentatae. *Bracteolae* magnae, latae, ovatae, rotundatae liberae vel subliberae, margine ubique in dentes 15–20 latos fere aequales profunde incisae ; dens medius iterum in partes 3 incisus glaber, non maculatus, dimidium corollae saltem aequans ; glandulae apice pedicelli sitae paullo prominentes ; pedicelli sulcati, angulati. *Calyx* laxus, cupularis, truncatus. *Corolla* citrina demum purpureo-vittata. *Capsula* ovata, acuta, bracteolis accrescentibus fere amplexa. *Semina* libera, atra, oblique striata lana duplici vestita, breviore (" fuzz ") imperfecta facile detergibili rufa, interdum tantum circum rostrum sita, longiore (" floss ") striis affixa.

The foliage is most striking and seems to change as the plant matures, hence it may be examined as follows :—

(*a*) *Cotyledons* transversely elliptic (twice as broad as long) entire, obtuse but not at all cordate, with 3–5 veins, which are winged and form a web-footed attachment to the winged petiole, foliage quite glabrous but prominently punctated with black dots ;

(*b*) *Early leaves* broad ovate entire acuminate or apiculate, becoming faintly cordate but not pedate, 3–5 veined and winged, as already described, when young with minute stellate hairs but turning quite glabrous and stipules narrow linear early caducous ; 1–3 veins may each carry a small linear gland near the base ;

(*c*) *Later leaves* cordate, 3-toothed or lobed on the apex (as in *G. mexicanum*), teeth broad deltoid acuminate, central one much the longest, petiole and young shoots winged, and web-footed within the cordature, but not pedate ;

(*d*) *Ultimate leaves* much as in *G. peruvianum*, very large coarsely-formed (not cut sharply and uniformly as in *brasiliense*) 5–7-lobed, bottom short pair pedate and parallel to the petiole, lobes sometimes conspicuously toothed on the margin, blade from apex of the petiole to tip of the central lobe 8–10 inches and across from tip to tip 10–15 inches, veins imperfectly winged but prominently web-footed and carry 1–3 glands that look like slits, with a tongue of epidermis within, veins and reticulations prominent above, pale coloured, deeply auricled (the auricles in the larger leaves overlapping the petiole) and the whole surface quite glabrous (except on the veins below where a few stellate hairs may be seen but the leaves as they unfold from the bud are almost tomentose soon becoming glabrous), petiole round but showing lines representing the wings and prominently gland-dotted, petiole 1–5 inches long.

*Twigs and shoots*, rounded or only faintly angled, quite glabrous, minutely gland-dotted, brown flushing purple. *Inflorescence* mostly axillary spurs which carry two to three flowers, floral stipules broad deflected, sometimes toothed. *Bracteoles* very large broad ovate rotund, free, or nearly so, deeply gashed around the entire margin into 15–20 broad nearly equal teeth, the central one again gashed into 3 but not abnormally elongated, quite glabrous, not maculate (as in *brasiliense*) but fully half the length of the corolla which is

lemon-yellow streaked with purple (as it matures) ; *glands* on the apex of the pedicel not very prominent ; pedicels furrowed and angled. *Calyx* a loose cup cut square across. *Capsule* ovate acute (not elongate acuminate as in *brasiliense*) almost entirely embraced by the accrescent bracteoles. *Seeds* free, black, with an imperfect easily separating fuzz which may be reduced to a rufous tuft around the beak, obliquely striated, the furrows giving attachment to the floss. According to a note on the Cuban plant, collected by C. F. Baker, " the seeds are of the kidney type " and one of Forrest's Chinese specimens shows the seeds distinctly kidneyed.

The following specimens may be recorded :—

Collected by *C. Wright*, Cuba (seeds free) : by *C. F. Baker*, Santiago de las Vegas, Cuba (more tomentose than in the recent collections and possibly hybridised with *G. mustelinum*), April, 1906, *103* and again Nov., 1909, *23*—he speaks of it as being a " tree cotton 12–15 feet high with broad spreading top " and of the seeds being of the " kidney type " and " late yield being destroyed by Boll Weevil," but he does not definitely say whether or not the plant is wild or cultivated though probably cultivated : by *Harris*, the Cauto plant (type) grown in the Hope Gardens, Jamaica, 4th May, 1914, also his Cuban plant collected 31st March, 1914 : by *Spruce 6541*, in Chanduy, South America ; by *B. G. C. Bolland* in Brazil (specimen just to hand) matches Baker's Cuban plant exactly except that the seeds are quite free : found in Bolivia by *Britton and Rusby*, in 1890, *647* and in 1891 *1201*, which I now transfer from *G. peruvianum* where I placed it in the " Wild and Cultivated Cottons " : discovered in Siam by *Kerr 10087*, (R) a specimen showing the seeds free but with the fuzz reduced to a rusty tuft around the beak, also (M) seedlings ; in Siam it is not a crop, but is spoken of as a cultivated perennial shrub or small tree : in Yunnan, China, it was three times collected by *Mr. George Forrest* during his explorations in 1917-19 *16608* and *16912* ; Mr. Forrest tells us that he found the plant on the Tong Shan (lat. 27° 12′N.) and at an altitude of 9,000 feet above the sea ; he speaks of it as a " semi-shrubby plant 4–7 feet, flowers light yellow, and found in dry situations in thickets " ; it was thus collected in a locality one would hardly have expected to find a cotton, one of the specimens shows the fruit almost linear and the seeds naked and distinctly kidneyed, while another has the flowers larger than is customary and the stipules very large but the web-footing of the veins obscure : collected in the Belgian Congo by *H. L. Shantz*, on 12th Feb, 1920 (*663*) and which he says was found " growing wild about the Lake " : by *M. T. Dawe* " native cotton found throughout Portuguese Congo in semi-wild state—collected at Lembe *72*, 24/9/21 " : lastly in addition to numerous hybrids not a few of the plants collected in Egypt belong to this species, such as *N. D. Simpson C. 824*, named *G. brasiliense*.

A tree cotton with very large coarsely formed leaves, the central, and often the other lobes, with prominent lateral teeth, the auricles

forming large supplementary pedate lobes and the veins web-footed, stipules very large and often toothed, flowers not much exceeding the bracteoles, fruit ovate, seeds free or adnate and with a coarse irregular fuzz. *G. brasiliense* Macf. var. *apospermum* Sprague in Kew Bull. 1914, pp. 198–99.

The Cauto Cotton of south-eastern Cuba and the *Fai Wang* of Siam.

Attention to this plant was first pointedly drawn by Mr. W. Harris, Supt. of Public Gardens and Plantations in Jamaica. He speaks of it as a tree cotton apparently found wild (or semi-wild) and tells us that it is a perennial likely to prove of considerable value for cultivation in dry districts within the tropics. Mr. Harris further observes that it is estimated to yield at least 1200 lbs. of seed-cotton per acre and since the wool has been sold at prices varying from 18–20 cents. per lb. in the American market, the plant gives promise of being of considerable value. Sprague, who published an account of it in the Kew Bulletin, gives it the above mentioned provisional name (*apospermum*) and says that it agrees, in most of the technical characters, with *G. brasiliense*, from which he thinks it differs in the seeds being free from one another, in consequence he observes that, in view of its being wild or semi-wild, it may represent the wild stock of that species, but he adds that, " the possibility of its being a hybrid of *brasiliense* with some other species cannot be entirely excluded."

At first I was disposed to concur with Mr. Sprague but on more careful study and with extended material came to see that this somewhat remarkable plant had better be accepted as a distinct species for which it might be desirable to assign a distinctive name. Apparently it embraces some of the forms included under Todaro's protean *G. microcarpum* and is possibly the plant Miers meant to denote by his *G. congestum*. But if it be viewed as only a hybrid then it would have to be accepted as a cross between *G. microcarpum* or *G. mustelinum* and *G. peruvianum*, certainly not *G. brasiliense*—a species at once recognised by the mature leaves being quite glabrous and sharply and neatly cut, the lobes oblong-linear-deltoid spreading acuminate, the auricles not pedate and the flowers very large, corolla often twice the bracteoles, fruit oblong tapering, beaked, seeds large naked and kidneyed. These are the best eye-marks of *G. brasiliense* and at once separate it from the plant here considered.

A specimen was sent to me from Siam, in 1925, by *Dr. A. F. G. Kerr 10087* which, not having then seen the Cuban plant, I identified as possibly *G. peruvianum* but the material was not satisfactory and I asked for further supplies to enable me to finally determine it. In consequence additional specimens have now come to hand (*10087R*) and I find that it matches, in every detail, Mr. Harris' Cuban plant, even to the seedlings, which in both cases have been supplied. But in addition Mr. N. D. Simpson has furnished me with several plants, under the so-called Hindi-weed of Egypt that

approximate very closely to the Cauto cotton, an observation which suggests that its influence in stock breeding may be pernicious.

On the other hand Mr. Simpson has sent me several specimens of hybrids of value that all manifest a strain of *G. pedatum* in their composition, such as the cotton known in Egypt as Sultani (*C. 794* = *G. peruvianum* x *pedatum*). In fact many of the hybrids of *G. peruvianum* are of the same nature, for example *C. 780* Malta H., *C. 793* Gila, *C. 807* New Brown, and *C. 824* almost typical *G. pedatum*. It would be interesting therefore to learn from Jamaica of the success that has been attained in the endeavour to make the pure Cauto cotton of commercial value. I may add that in Siam the plant is well-known and bears the vernacular name of *Fai Wang* but while cultivated is not a regular crop.

**Hindi Weeds** mostly hybrids with a more or less pronounced strain of *G. pedatum*.

Splitting hybrids or rogues appear in most cotton fields throughout the cotton area. In Egypt they are collectively designated "Hindi Weeds." How the name arose I have been unable to discover, but it does not appear to have anything to do with India. There are several significant features of the Hindi Weeds collectively: they are nearly all glabrous; the flowers are remarkably small and the bracteoles large; they are hybrids that manifest more than two strains in their composition but one seems almost universally present, viz., *G. pedatum*. To that influence is attributable the large coarse leaves that they nearly always manifest. *G. pedatum* has, for the first time, been separately recognised in these notes, and the suspicion that it is responsible for the production of plants that rapidly degenerate gives the subject exceptional interest to the cotton grower; a warning to avoid such hybrids.

The following are the chief examples of Hindi Weeds met with in Egypt :—

(*a*) *Plants in which G. mexicanum is the chief strain, but some show G. hirsutum.*

*C. 41.* "Hindi hybrid" derived from Commercial *Ashmouni* grown for M. Egolin in 1923=*G. mexicanum* x *hirsutum* x *pedatum* (veins of mature leaves web-footed, bracteoles recalling *G. brasiliense*.)

*C. 42.* "Hindi hybrid" from Commerical *Ashmouni*=*G. mexicanum* x *peruvianum* x *pedatum*. Very much like some of the Upland American Cottons.

*C. 43.* "Hindi hybrid from Commercial *Ashmouni*." (Same as *C.* 41 only leaves very markedly *pedatum*, fruit and bracteoles as in *G. brasiliense*).

*C. 44.* "American—a rogue from Commerical *Ashmouni*"=*G. mexicanum* x ? *hirsutum*; *Ashmouni*, as seen by me, has uniformly been a form of *G. peruvianum* which this splitting hybrid most certainly is not.

*C. 45.* "American, a rogue from Commercial *Ashmouni*"= *C. 44.*

*C. 46.* "Hindi from Commercial *Ashmouni*"=same as *C. 44* and *C. 45* with margins of the leaves turning purple—a frequent condition in *G. mexicanum.*

*C. 47.* "Hindi hybrid—a rogue from Commercial *Ashmouni.*" This is a very different plant from *C. 41-C. 46* and is possibly a hybrid of *G. mexicanum* x *barbadense*—seems a higher standard of hybrid—faintest trace of *G. pedatum* the older and larger leaves having the veins only slightly web-footed.

*C. 48.* "American type—a rogue from Commercial *Ashmouni*" —*G. mexicanum* x ? *hirsutum.*

*C. 810.* "Hindi from *Balls' 95.*"=*G. mexicanum* almost pure. Had it not been sent to me as a Hindi Weed I could not have picked it out as a weed. The seed is large densely coated with grey-green fuzz ; the floss seems to originate in tufts, the stipules are ovate tailed and the calyx teeth are very large rounded. In some respects it is suggestive *G. Darwinii.*

*C. 811.* "Hindi from a single plant in *Balls' 95.*" I cannot separate this from *C. 810*—both are apparently splitting forms from *mexicanum*=glabrous plants with large open calyx and short purple (not pale yellow) flowers—it is possible that they are hybrids *G. mexicanum* with a trace of *G. pedatum.*

*C. 814.* "Hindi from a single plant from *Balls' 95*" =*G. mexicanum* x *pedatum* with a trace of *G. peruvianum.*

(*b*) *Plants in which G. peruvianum is the chief strain.*

*C. 777* and *C. 778.* "*Dakker* (*Thakker* male)." This seems to be a non-fruiting plant and appears to be a hybrid *G. peruvianum* var. *Irvingianum* x *mexicanum.*

*C. 812.* "Hindi from a single plant in *Balls' 95.*" Is a hybrid of *G. mexicanum* x *peruvianum* x *pedatum.* The very large bracteoles and remarkably small flowers, large seeds with green fuzz and tangled floss, are striking features. The older leaves are distinctly those of *pedatum.*

*C. 813.* "Hindi from a single plant from *Balls' 95.*" Is a hybrid of *G. peruvianum* x *mexicanum.* I see little to separate this from *C. 42.* The stock may have sprung from generations of hybrids. One seed may revert to one specific type, another to another.

†4. Leaves almost quite glabrous, and in herbarium specimens usually drying into a brown colour, deeply cordate, very broad and large, cut into five palmately spreading acuminate lobes, the central one the longest, and often from 4–8 inches in length ; flowers very large, and bracteoles sometimes maculated on the inner surface ; fruit elongated, 3-celled, and seeds almost quite naked, striated, and usually united into a kidney mass.

**G. brasiliense** *Macf.* ; Watt, l.c. pp. 245, 295–315, plates 49 and 50.

*Leaves* almost quite glabrous and sharply and neatly cut, the lobes oblong-linear-deltoid spreading acuminate, deeply cordate but the auricles not pedate, the central lobe the largest and often 4-8 inches in length ; stipules usually large linear. *Flowers* very large, corolla often twice the bracteoles. *Bracteoles* very large ovate sub-acute, deeply gashed, the middle tooth often the larger and longer, sometimes maculated on the inner surface. *Capsule* linear-oblong tapering beaked 3-celled. *Seeds* almost quite naked, striated and usually united into an elongated kidney mass.

Kidney, Chain, Brazilian, Guianan, Bahia, Pernambuco, &c., &c., Cottons.

A sub-arboreous bush associated with Brazil. Lerius, who wrote a history of that country, in 1557, speaks of it as having the seeds much pressed together after the form of a man's kidney. Marcgraf describes it as growing in damp warm places, especially on cultivated ground. No botanical specimen, seen by me, is stated to have been collected from a truly wild plant, though not a few are recorded as ferine. And Branner, who wrote a special report on the Cottons of Brazil, states that there are two indigenous and one exotic cottons found in that country. The former are the *crioulo* or kidney cotton and the *quebradinho*, or cotton with free black seeds (? *G. vitifolium*), while the exotic, which he calls *riqueza*, or wealth-giving, was most probably *G. hirsutum* or *G. peruvianum*. It is thus highly likely that *G. brasiliense* is actually indigenous to Brazil and Koster (Travels in Brazil 1816) speaks of the " Wild Cotton " of the country—but he preserved no specimen. The early writers would thus seem to have admitted the existence of an indigenous or wild species in Brazil.

The following specimens may be specially cited :—

India : *Watt,* Ponnur S. Mahratta ; Ahmedabad ; Bangalore, &c. Mascarene Islands : *Balfour fil.* Africa : *H. L. Shantz,* Belgian Congo *635* and *643,* " as a wild plant alongside of paths in native grass." Siam : *Dr. Kerr 10087,* also *3148* " cultivated " (vern. *Fai Luang*). Philippines : *Bureau of Science 256.*

It is somewhat remarkable that, while *G. brasiliense* stands every chance to have been one of the ancestors of Sea Island Cotton, no recent experimenter has attempted the investigation of that species. Moreover, in herbaria, it is the least represented of all the species of *Gossypium*. I have in these notes separated a fairly distinct plant (as *G. pedatum*) hitherto treated as *G. brasiliense* and the effort to do so has convinced me that the seeds adhering into a kidney-like mass is by no means an invariable characteristic. In *G. pedatum* the seeds are both free and united. The union, however, in most cases is more a close interlacement of the floss than actual adhesion of the seeds.

Not a few of the examples of *G. pedatum*, recorded by the collectors as being *G. brasiliense* are further stated to be wild indigenous plants.

A very considerable number of the hybrids grown at the Giza Experimental Farm Egypt show an undoubted strain of *G. pedatum* (conf. with *G. peruvianum*).

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## XXXIX.—DECADES KEWENSES Plantarum Novarum in Herbario Horti Regii Conservatarum. DECAS CXVIII.

1171. **Onobrychis prolifica** *Dunn* [Leguminosae-Hedysareae]; ab *O. nummularia* Stocks distat legumine ubique setis tecto non margine tantum.

*Herba* annua, globosa, omnino griseo-tomentosa, 10 cm. diam. *Caules* abbreviati, plures, racemos foliaque e basi emittentes. *Folia* 1–5-foliolata, racemis breviora. *Foliola* rotundata, basi obtusa vel cuneata, 1–3 cm. longa, stipulis membranaceis elongatis ad petiolos adnatis. *Racemi* pluriflori. *Flores* subsessiles. *Calyx* fere ad basin in dentes lineares acuminatos divisus, 5 mm. longus. *Vexillum* ovatum, basi attenuatum, 5 mm. longum. *Alae* minutae. *Carina* vexillo et calyci aequalis, apice oblique truncata, lamina basi auriculata. *Stamina* ut carina et stylus abrupte inflexa, primo in tubum coalita, tandem diadelpha. *Ovarium* sessile, 1-ovulatum; stylus filiformis, stigmate parvo terminatus. *Legumen* indehiscens, compressum, orbiculatum, lacunoso-rugosum, ligneum, aculeis innocuis ubique tectum, 7 mm. diam., aculeis fere diametrum leguminis aequantibus araneoso-gossypinis.

British Beluchistan. Gustoi, 28th May, 1897, *Duthie* 20513.

1172. **Scaevola scaberula** *Summerhayes* [Goodeniaceae]; affinis *S. hispidae* Cav., sed floribus minoribus, antheris nudis, et *S. collari* F. Muell., a qua ramis foliisque scaberulis, floribus pedunculatis et corolla extra stellato-pilosa differt.

*Herba* rigida; caules erecti vel suberecti, fere simplices, usque ad 30 cm. alti, leviter longitudinaliter striati, scaberuli et breviter glanduloso-pilosuli, internodiis brevibus. *Folia* patentia, sessilia, lineari-lanceolata vel oblongo-linearia, obtusa, 1–2 cm. longa, 1·5–4 mm. lata, margine leviter revoluta, interdum subdentata, utrinque praesertim supra breviter glanduloso-pilosula, scaberula. *Flores* solitarii, in axillis foliorum superiorum (bractearum) dispositi; pedunculus gracilis, 7–12 mm. longus; bracteolae lineares, obtusae, 7–14 mm. longae, indumento foliis similes, ad (vel prope) apicem pedunculi. *Calycis* tubus brevis, inferne ovario adnatus; lobi 5, lineari-lanceolati, obtusiusculi, 5–6 mm. longi, 1–1·4 mm. lati, utrinque glanduloso-pilosuli. *Corollae* segmenta oblongo-linearia, superne leviter dilatata, acuta, utrinque alis latis albidis non-venosis instructa, ita ut videantur spathulata, 11–13 mm. longa, cum alis 5–6 mm. lata, extra stellato-pilosa, intus inferne pilis retrorsis induta. *Filamenta* anguste linearia, 4 mm. longa; antherae oblongae, 2 mm. longae; connectivum apice nudum. *Stylus*

pilosus, 7 mm. longus, indusio cupulari dense ciliato extra piloso ; stigma compressum, breviter bilobum. *Ovarium* uniloculare, ovulis duobus. *Fructus* non visus.

New South Wales. Ettrema River, south-west of Nowra, on poor sandstone country, Feb. 1927, *F. A. Rodway*.

1173. **Rupicola gnidioides** *Summerhayes* [Epacridaceae-Epacreae]; ab *R. styphelioide* Maiden et Betche ramulis hirsutis, foliis minoribus hirsutis, floribus minoribus, filamentis valde longioribus facile distinguenda.

*Frutex* nanus, ramis ramulisque procumbentibus vel adscendentibus usque ad 25 cm. longis ; ramuli tenues, albido-hirsuti. *Folia* imbricata, breviter petiolata, lanceolata, apice obtusa, basi angustata, 5–8 mm. longa, 1–2 mm. lata, supra concava, subtus convexa, utrinque albido-hirsuta, siccitate subtus nervis prominentibus. *Flores* solitarii, in axillis foliorum supremorum dispositi, pedunculati. *Bracteae* numerosae, imbricatae, lanceolatae, acutae, pubescentes, a basi ad apicem pedunculi dispositi eumque omnino obtegentes, supremae sepalis subsimiles sed breviores. *Sepala* 5, lanceolata, acuta, 2·5–3 mm. longa, 0·7–0·8 mm. lata, ciliata, extra pilosa, intus glabra. *Corolla* subrotata, extra glabra, intus pilosa ; tubus brevis, 1–1·2 mm. longus ; lobi late lanceolati, acutissimi, 2·7–3 mm. longi. *Stamina* fauce corollae inserta ; filamenta filiformia, apice applanata, circiter 2 mm. longa ; antherae exsertae, basi excepta adnatae, oblongae, 1 mm. longae. *Ovarium* late cylindricum, quinquelobum, 5-loculare, pubescens ; stylus gracilis, 3–3·5 mm. longus, stigmate minuto ; ovula pro loculo numerosa. *Capsula* latissime ellipsoidea, apice depressa, circiter 2 mm. longa, pubescens, loculicide dehiscens ; semina numerosa, falcatim breviterque fusiformia, flavo-brunnea, 0·5–0·6 mm. longa.

New South Wales. Ettrema River, south-west of Nowra, in cleft in sandstone cliff, Feb. 1927, *F. A. Rodway*.

1174. **Stapelia Tapscottii** *Verdoorn* [Asclepiadaceae] ; affinis *S. Cooperi* N.E. Br., sed floribus albidis, caulis dentibus 1–3 cm. longis differt.

*Caules* carnosi, glabri, 5–9 cm. longi, obtuse 4-angulati, dentibus 1–3 cm. longis robustis ad apicem acutum planum attenuatis minute bidenticulatis interdum purpureo-maculatis. *Flores* in pedunculo brevi crasso 3 vel plures ; pedicelli 5–6 mm. longi, circiter 2 mm. crassi. *Sepala* lineari-lanceolata, acuta, circiter 1 cm. longa, glabra. *Corolla* a basi stellato-patens, albida, circiter 5 cm. diametro ; tubus 7 mm. longus, in disco annulatus ; lobi ovati, acuti, 2 cm. longi, 1·3 cm. lati, pilis vibratilis clavatis ornati, extra laeves et inconspicue 5–7-nervi, supra dense papilloso-verrucosi. *Corona* exterior patens, 5-loba, lobis 2 mm. longis bilobis, interior incumbens, dorso breviter cornuta apice erecto subulato-clavato.

South Africa. Bechuanaland : Lobatsi, *S. Tapscott* (Herb. Kew and McGregor Mus., Kimberley).

1175. **Arrabidaea (Macrocarpaea, Indutae, Discolores) calodictyos** *Sprague* [Bignoniaceae-Bignonieae] ; affinis *A. candicanti* DC., a qua rete venularum paginae superioris foliolorum crebro conspicuo elevato differt.

*Frutex* ope cirrhorum simplicium scandens. *Rami* seniores exstantes teretes, circiter 6 mm. diametro, multicostatuli, minutissime puberuli vel glabrati, fusco-grisei, defoliati. *Ramulus* florens unicus exstans patens, 50 cm. longus, costatulus, minute pubescens, nigrescens ; internodia 6–12 cm. longa. *Folia* bifoliolata, cirrho simplici terminata ; petioli 3·5–8 cm. longi, minute pubescentes ; petioluli 1·2–4 cm. longi ; foliola ovato-oblonga (rarius elliptico-oblonga), acute acuminata, basi rotundata, 9–15 cm. longa, 4–7 cm. lata, tenuiter coriacea, supra purpurascenti-brunnea, nitida, primo visu glabra revera secus nervos venulasque minute puberula mesophyllo minute sparse lepidoto, rete venularum conspicuo creberrimo satis elevato, subtus juventute minute sordide cano-tomentella, mesophyllo tandem plusminusve glabrato nitidulo saepe purpurascente nervis venulisque maxime intricatis minute pubescentibus ; nervi laterales utrinsecus 5–7, arcuato-ascendentes, inferiores quam superiores magis obliqui, supra paullulum elevati subtus prominentes. *Thyrsus* pyramidalis, multiflorus, 12 cm. longus, pedunculo 7·5 cm. longo excluso ; pedicelli 4–5 mm. longi, pilis fulvis dense furfuraceo-pubescentes. *Calyx* campanulatus, minute crasse obtuse 5-dentatus, circiter 5 mm. longus, extra minute pubescens, purpurascens, intus glaber. *Corolla* (expansa non visa) in alabastro circiter 2 cm. longa, subacuta, pilis ferrugineis extra furfuraceo-velutina ; tubus basalis 2·5 mm. longus. *Stamina* apice tubi basalis inserta ; filamenta basi pilis longis glanduloso-capitatis dense induta, longiora in alabastro circiter 1·3 cm., breviora circiter 1 cm. longa, antherarum thecae in alabastro ab apice filamenti pendulae vel leviter divergentes, 2·5–3 mm. longae ; connectivum in appendicem triangularem acutum productum. *Staminodium* vix 5 mm. longum. *Discus* pulvinaris, vix 1 mm. longus, apice leviter excavatus. *Ovarium* oblongum, 2 mm. longum, minute densissime lepidotum. *Ovula* 12–16 pro loculo, biseriata.

Venezuela. Locality unknown, *Pittier* 11883 (type in Herb. Kew.). Miranda : on the road from La Guaira to Caracas, near Las Trincheras, in thickets, *Pittier* 10377 (Herb. Mus. Comerc. Venez.).

The number of ovules is very difficult to determine owing to their being minute and easily detachable. It may be larger than stated.

1176. **Rhynchostylis latifolia** *Fischer* [Orchidaceae] ; *R. retusae* Bl. affinis, foliis minoribus planis oblongis, floribus valde minoribus differt.

*Planta* epiphytica. *Caulis* brevis, crassus, foliorum marcidorum vaginis vestitus. *Radices* multae, longae. *Folia* coriacea, oblonga, plana, sub-carinata, 4–7 cm. longa, 1·7–2·4 cm. lata, apice aequaliter vel inaequaliter obtuse biloba. *Racemi* vel *paniculae* infra folia

*Rhynchostylis latifolia.* A and B side and front aspects of whole flower (× 7). C pollinia and caudicle (× 9). D bract (× 8).

laterales, 7–14 cm. longi; vaginae 1–2, cupulares, ore obliquae, subacutae, 4 mm. longae. *Flores* circiter 3 mm. longi; bracteae ovato-lanceolatae, acuminatae, 1·5–3 mm. longae; pedicelli brevissimi. *Sepala* et *petala* similia, ovato-oblonga, obtusa, uninervia, subcarinata; sepala lateralia ceteris majora, 3 mm. longa, basi columnae adnata. *Labellum* in basi columnae sessile. *Calcar* scrotiforme, horizontale, glabrum. *Epichilium* calcari aequilongum, recurvum, carnosum, lineari-oblongum, supra profunde canaliculatum, apice in conum deflexum incrassatum. *Columna* brevis; rostellum breviter rostratum. *Pollinia* 2, sulcata; caudicula ligulata elongata. *Capsula* non visa.

South India. Cardamonai, Mysore, Sept. 1903, *C. A. Barber* 6093.

1177. **Isachne Vaughanii** *C. E. Hubbard* [Gramineae]; affinis *I. angustae* Stapf, sed culmis altioribus, foliorum laminis longioribus, paniculis angustis, ramis erectis appressis, spiculis majoribus differt.

*Gramen* perenne, laxe caespitosum. *Culmi* erecti vel geniculato-ascendentes, graciles, 10–45 cm. alti, teretes, simplices, multinodi, innovationibus extravaginalibus, dense appresseque pubescentes. *Foliorum vaginae* arctae, subpersistentes, tenuissime striatae, 1·2–2·5 cm. longae, internodiis breviores, breviter pubescentes, ore breviter barbatae, marginibus ciliatae; ligulae nullae vel ad seriem ciliarum brevium reductae; laminae lineares vel lineari-lanceolatae, subobtusae vel tenuiter acutae, 3–6 (raro 1 cm.) longae, planae, distantes, patentes, rigidulae, supra virides glabrae laevesque, infra glaucae asperulaeque vel minute pubescentes, marginibus minute scaberulae, tenuissime nervosae. *Panicula* angustissima, gracilis, longe exserta, 3·5–8 cm. longa, ad 7 mm. lata; rhachis gracilis, sparse pubescens vel fere glabra; rami 3–4, solitarii, erecti appressique, 2–8-spiculati, 0·75–4 cm. longi, glabri laevesque; pedicelli 1–5 mm. longi, appressi, glabri laevesque, ad apicem incrassati. *Spiculae* hiantes, pallidae vel glauco-virides, 2·6 mm. longae. *Gluma inferior* late ovata vel elliptico-ovata, obtusa vel subacuta, 2·4–2·6 mm. longa, 5–7-nervia, membranacea, superne sparse pubescens; gluma superior elliptica, obtusa, 2·5 mm. longa, 7–9-nervia, membranacea, apice breviter pubescens. *Anthoecium inferius* ♂, ellipticum, subacutum, 2 mm. longum, albido-viride, sparse et breviter pubescens vel fere glabrum; lemma applanatum late ellipticum et rotundato-obtusum, chartaceum, 7-nervium; palea elliptica, subacuta; antherae oblongae, 1·4 mm. longae. *Rhachillae* internodia 0·5 mm. longa. *Anthoecium superius* ♀, inferiori simile, sed totum appresse pubescens. *Caryopsis* oblonga, fusca, 1 mm. longa, 0·5 mm. lata.

Mauritius. Stream banks near Grand Bassin, rare, 13th Nov., 1926, *Vaughan* A.102.

*Isachne Vaughanii* C. E. Hubbard, showing habit. A Spikelet (× 10). B Lower glume (× 10). C Upper glume (× 9). D Lower floret from back (× 9). E Lemma of lower floret partially opened out (× 7). F Palea of lower floret (× 9). G Upper floret (× 8).

1178. **Stipa Clelandii** *Summerhayes & Hubbard* [Gramineae]; affinis *S. aristiglumi* F. Muell., a qua glumis lemmatibus aristisque longioribus, lemmatibus densius pilosis pilis apice usque ad 5 mm. longis differt.

*Gramen* perenne, caespitosum. *Culmi* erecti, circiter 1 m. alti, modice graciles, simplices, firmi, teretes, glabri, laeves, 4-nodi, nodis et partibus internodiorum infra nodos breviter retrorseque albido-sericeo-pubescentibus. *Foliorum* vaginae arctae, internodiis breviores, inferiores asperulae, superiores glabrae laevesque, ciliatae, apice linea transversa dorsali pilorum albidorum instructae; ligulae truncatae, 1 mm. longae, ciliatae; laminae anguste lineares, in acumen longe attenuatae, involutae, 11–36 cm. longae, applanatae 3–3·5 mm. latae, firmae, rigidulae, supra breviter denseque pubescentes, subtus setoso-pilosae demum glabrescentes, scaberulae. *Panicula* erecta, stricta, angusta, 20–25 cm. longa, 1·5–3·5 cm. lata, subdensa; rhachis teres, tenuiter striata, scaberula, nodis inferioribus sericeo-pilosis; rami plus minusve erecti, usque ad 6 cm. longi, ad 4-nati, graciles, scaberuli. *Spiculae* 1·8–2 cm. longae, leviter turgidae, pallide stramineae vel purpureo-suffusae. *Gluma* inferior anguste lanceolata, acuminata, tricuspidata, 1·8–2 cm. longa, tenuiter chartacea, glabra, trinervia, nervis lateralibus manifestis; gluma superior anguste lanceolato-oblonga, apice 3–5-fida, 1·1–1·6 cm. longa, 5-nervia. *Lemma* oblanceolato-oblongum, apice integrum, cum callo 7–8 mm. longum, cylindricum, leviter turgidum, pilis adpressis sericeis fulvis apice usque ad 5 mm. productis dense indutum; callus 2 mm. longus, indumento lemmati similis; arista in toto circiter 5 cm. longa, bigeniculata, scaberula, columna ad 1·4 cm. longa, cum parte inferiore setae adpresse pubescente. *Palea* lemma aequans, indumento similis. *Caryopsis* anguste obovoideo-fusiformis, pallide brunnea.

South Australia. Kinchina, Nov. 1924, *J. B. Cleland* S.40.

1179. **Stipa congesta** *Summerhayes & Hubbard* [Gramineae]; ab affini *S. aristiglumi* F. Muell. panicula densa, gluma superiore trinervia, lemmatis apice brevissime lobato, aristae columna breviter pilosa satis distinguenda.

Basis ignotus. *Culmus* unus a nobis visus erectus, moderate validus, plus 40 cm. longus, teres, dense pubescens. *Foliorum* vaginae arctae, 11–15 cm. longae, tenuissime striatae, firmae, breviter pubescentes interdum glabrescentes; ligulae rotundato-truncatae, 2 mm. longae, ciliolatae; laminae anguste lineares convolutae vel involutae, 18–35 cm. longae, applanatae 3·5 mm. latae, rigidulae, firmae, puberulae, minute tuberculatae, tenuiter striatae. *Panicula* oblonga, densa, 11 cm. longa, ad 3 cm. lata; rhachis teres, puberula; rami 2–3-nati, erecti, usque ad 2·5 cm. longi, graciles, scaberuli; pedicelli filiformes, 1–5 mm. longi. *Spiculae* 1·3–1·4 cm. longae, nitidae, albido-stramineae. *Glumae* subaequales, anguste lanceolatae, tenuiter acuminatae, 1–1·4 cm. longae, membranaceae, pubescentes, trinerviae, nervis lateralibus

ad mediam glumam attingentibus. *Lemma* oblongum, subcylindricum, cum callo 5·5 mm. longum, apice brevissime bilobulatum, lobulis obtusis 0·25 mm. longis, adpresse albido-pilosum ; callus 1 mm. longus, dense pilosus ; arista 2·5–3·5 mm. longa, fere stricta vel bigeniculata, parte inferiore sparse sericeo-pilosa, pilis adscendentibus. *Palea* lemma aequans. *Antherae* lineares, 2·75 mm. longae.

South Australia. Morialta, near Adelaide, Oct. 1925, *J. B. Cleland* S.33.

1180. **Stipa variegata** *Summerhayes & Hubbard* [Gramineae] ; a *S. pubescente* R.Br. culmis brevioribus gracilioribusque, panicula breviore, glumis tenuiter acuminatis, anthoecio breviore apice piloso, aristae columna valde breviore recedit.

*Gramen* perenne, caespitosum. *Culmi* erecti, ad 35 cm. alti, simplices, graciles, teretes, laeves, 2-nodi, nodo summo exserto, nodis brevissime pilosis exceptis glabri. *Foliorum* vaginae arctae, inferiores imbricatae, auriculatae, firmae, glabrae, laeves, ore breviter barbatae ; ligulae truncatae, 0·5 mm. longae, ciliolatae ; laminae erectae, cylindrico-filiformes, in acumen durum longe attenuatae, 7·5–19 cm. longae, 0·5–1 mm. diametro, involutae, praeter margines scaberulos laeves, glabrae. *Panicula* secunda, laxiuscula, aristis exclusis 8–16 cm. longa, 2·5–3·5 cm. lata ; rhachis gracilis, teres, scaberula ; rami pedicellique filiformes, scaberuli, pedicelli 2–8 mm. longi. *Spiculae* 1·6–2 mm. longae, purpureo-suffusae. *Gluma* inferior angustissime lanceolata, tenuissime acuminata, spiculam aequans, membranacea, glabra, trinervia, nervis lateralibus manifestis ; gluma superior inferiori similis, 1·3–1·6 cm. longa. *Lemma* ut videtur lineari-teres, cum callo 7 mm. longum, apice bilobulatum, lobulis 0·3 mm. longis, subdense sericeo-pilosum, pilis albidis adpressis vel adscendentibus ; callus 2–3 mm. longus, pallide fulvo-pilosus ; arista 4·5–8 cm. longa, bigeniculata et interdum fere stricta, gracilis, pallide straminea, columna circiter 1 cm. longa breviter pilosa. *Palea* lemma aequans.

South Australia. Sandergrove near Lake Alexandrina, Oct. 1926, *J. B. Cleland* S.36.

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## XL.—APLOSTELLIS AND CORYMBIS.

T. A. Sprague and C. E. C. Fischer.

In connection with the continuation of Gamble's " Flora of the Presidency of Madras " it was necessary to decide what names should be adopted for several of the genera of *Orchidaceae*, in particular *Nervilia* Gaud. and *Corymbis* Thou. *Nervilia*, which was treated in Benth. & Hook. f. Genera Plantarum and Hook. f. Fl. Brit. Ind. as congeneric with *Pogonia* Juss., is now regarded as an independent genus, for which the name *Aplostellis* Thou. has been adopted by some authors.

The generic name *Aplostellis* was attributed in the Index Kewensis to Thouars, Orch. Iles Austr. Afr. t. 24 (1822), doubtless because it had been cited by Lindley (Orch. Gen. & Sp. 411 : 1840) as a generic synonym of *Haplostellis* Endl., and by Bentham (Gen. Pl. iii. 615 : 1883) as a synonym of *Nervilia* Gaud., which he treated as a section of *Pogonia* Juss. Pfitzer (Engl. & Prantl, Nat. Pflanzenfam. ii. Abt. 6, 219 : 1889) and Schlechter (Engl. Jahrb. xlv. 399 : 1911) also appear to have regarded *Aplostellis* Thou. as a generic name ; and Ridley (Fl. Mal. Penins. iv. 203 : 1924) has adopted it in place of *Nervilia* Gaud. on the ground of priority of publication.

*Aplostellis* Thou. was, however, not a generic name but the name of a species. A critical examination of Thouars's preliminary paper " Sur l'histoire des plantes orchidées des îles australes d'Afrique (Nouv. Bull. Soc. Philom. Paris, i. 314-319 : 1809) and of his Orch. Iles Austr. Afr. (1822) shows that his system of nomenclature has been completely misunderstood by Lindley and other authors. He attempted to introduce two innovations into the nomenclature of Mascarene Orchids : (1) that all generic names of *Orchidaceae* should end in *-orkis* (*-orchis*) ; and (2) that each Mascarene species of that family should be known by a *single name* instead of a *binary combination*. These innovations were not accepted by other botanists, and when Thouars published his plates of Mascarene *Orchidaceae* in 1822 he employed a double system of nomenclature in the tables and plates, the names of genera and species according to his own peculiar method being followed by corresponding names in accordance with the established system. Thus *Aplostellis* Thou. was the uninominal name of a new *species* from Mauritius, which he placed under the new genus *Stellorkis* (*Stellorchis*) ; he appended the new binary combination, *Arethusa simplex*, for those who preferred to follow the generally accepted methods of nomenclature.

The mode of formation of the uninominal names of species was explained in Thouars's preliminary paper. The first half was an abbreviation or Greek translation of the trivial name ; and the second half was composed of the first part of the generic name with the suffix *-is*. Thus *Aplostellis* is a portmanteau word composed of *aplo-*, the Greek equivalent of *simplex*, and *stellis* a contraction of *Stellorkis*.

*Aplostellis* as a *generic* name was proposed by A. Richard in 1828, but this is antedated by *Stellorkis* Thou. (1809) and *Nervilia* Comm. ex Gaud. (1826). Under Art. 20 of the International Rules, the name *Nervilia* has been conserved for the genus.

The generic name *Corymbis* has also been attributed to Thouars, but *Corymbis* Thou., like *Aplostellis*, was the name of a species, the corresponding generic name proposed by Thouars being *Corymborkis* (*Corymborchis*). *Corymbis*, as a generic name, should apparently be attributed to Lindley, Veg. Kingd. 183 (1846), who there merely mentioned it by name, as a genus about which nothing certain was known ; or to H. G. Reichenbach in Bot. Zeit. 1849, 868, who

indicated that it was very closely related to *Chloidia* Lindl. (1840). The earliest name for the genus is *Corymborkis* Thou. (1809), which Thouars corrected to *Corymborchis* in 1822.

A statement of the generic synonymy of *Nervilia* (*Aplostellis*) is appended.

**Nervilia** *Commerson ex Gaud.* in Freyc. Voy., Bot. 421, t. 35 (1826), *nomen conservatum.*
*Stellorkis* Thou. in Nouv. Bull. Soc. Philom., Paris, i. 317 (1809).
*Stellorchis* Thou. Orch. Iles Austr. Afr., Tabl. Genres, g, t. 24 (1822)
*Cordyla* Blume, Bijdr. 416 (1825), non Lour. (1790).
*Aplostellis* A. Rich. in Mém. Soc. Hist. Nat. Par. iv. 36 (1828).
*Roptrostemon* Blume Fl. Jav., Praef. p. vi. (1828), sub nomine *Cordyla.*
*Haplostellis* Endl. Gen. 219, n. 1603 (1837).
*Rophostemon* Endl. l.c. 216, n. 1578 (1837).
*Haplostelis* Reichb. Nomencl. 1. 56 (1841).

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## XLI.—MISCELLANEOUS NOTES.

We learn that Dr. B. T. Dickson, Professor of Botany, Macdonald College, Quebec, has been appointed by the Australian Government to be Chief Mycologist on the Council of Scientific and Industrial Research.

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Mr. J. Robbie, Student Gardener, Royal Botanic Gardens, Kew, has been appointed by the Government of the Sudan, Assistant Superintendent of Gardens, Khartoum Province.

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The following appointments have been made by the Secretary of State for the Colonies :—Mr. J. L. B. Kincaid, B.Sc., and Mr. A. de K. Frampton, Superintendents of Agriculture, Nigeria ; Mr. J. P. Walters, Produce Inspector, Nigeria ; Mr. C. Harvey and Mr. A. S. Stenhouse, B.Sc., District Agricultural Officers, Tanganyika Territory ; Mr. J. A. Craig and Mr. R. G. Heath, B.Sc.(Agric.), to be Agricultural Field Officers, Federated Malay States.

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**Euphorbia caducifolia.**—In Kew Bull. 1925, p. 341, it was stated that figure 486 of W. A. Talbot's Forest Flora of the Bombay Presidency and Sind, ii, 434, under *Euphorbia neriifolia* Linn. was probably the above named species. Through the courtesy of Mr. E. M. Hodgson, C.I.E., Chief Conservator of Forests, Bombay Presidency, specimens have been received which were collected in the locality quoted by Talbot, at elevations from 1935 to 2360 feet. As anticipated, they are of *E. caducifolia* Haines. The local vernacular name is *Gootgalli* (Kanarese) ; the milky juice of the plant is used locally as a cure for rheumatism.

C. E. C. F.

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**Botanical Magazine.**—Part i of Vol. clii (1926) of the Botanical Magazine, which was published in August, 1927, contains the following illustrations :—

*Magnolia Sprengeri diva* Stapf (t. 9116), from China ; *Cypripedium manchuricum* Stapf (t. 9117), a new species from Siberia ; *Anagallis collina* Schousb. (t. 9118), a native of South Europe and North Africa ; *Rhazya orientalis* DC. (t. 9119), an Apocynaceous genus from N.W. Asia Minor and Thrace ; *Rhododendron megeratum* I. B. Balf. & Forrest (t. 9120), from the mountains of the Yunnan-Tibetan frontier ; *Primula effusa* W. W. Smith & Forrest (t. 9121), a native of North Yunnan ; following the description of this species a key to the *Malacoides* series of *Primula* is given which is of considerable value. It is also of interest to record here that *Primula effusa* has already produced double flowers under cultivation at Kew, though it has only been grown as a garden plant for a few years. *Salix gracilistyla* Miq. (t. 9122), from Japan and Korea, is the next plant figured and is followed by *Aster Forrestii* Stapf (t. 9123), a new species from S.W. China and Tibet ; *Acacia marginata* R. Br. (t. 9124), a native of S.W. Australia ; *Spartina Townsendii* H. & J. Groves (t. 9125), the grass which has spread over the mud flats of Southampton Water, etc. ; and *Habranthus robustus* Herb. ex Sweet (t. 9126), a native of Uruguay or Argentina.

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**Pritzel's Iconum Botanicarum Index.**—The Royal Horticultural Society of London have been engaged for some years in preparing a continuation of the *Iconum Botanicarum Index* of Georg August Pritzel, the first edition of which was published in 1855, with a supplementary list of references up to the end of 1865 which was issued in 1866.

These two volumes, which contain over 107,000 references to illustrations of Flowering Plants and Ferns, have remained till now the standard Alphabetical Register or book of reference to the illustrations of plants which have appeared in botanical, horticultural and other publications.

Owing to the enormous development in the facility of reproducing illustrations and the vast number of new plant figures which have been published since the appearance of Pritzel's supplementary volume, the Council of the Royal Horticultural Society decided in 1917 to undertake the revision and continuation of Pritzel's Index.

The work has been carried out at the Royal Botanic Gardens, Kew, where accommodation has been placed at the disposal of the Society in the Herbarium and Library, and the resources of the Library and the use of the Kew manuscript supplement of the Pritzel Index, which has been continued at Kew, have been granted to the Society.

The work of editing this important undertaking is in the hands of Dr. O. Stapf, F.R.S., late Keeper of the Herbarium. The task is now nearing completion, and the first portion is ready for press.

The new edition, which will also include the references in the original Index, will contain 450,000 references to illustrations of Flowering Plants, Ferns and Fern Allies published in botanical, horticultural, and other works and journals between the years 1753 and 1920 (inclusive). Further it is proposed to issue periodic supplements at intervals, the first being already in preparation.

The new work will bear the title

Iconum Botanicarum
INDEX LONDINENSIS
sive
G. A. Pritzelii
Iconum Botanicarum
Index locupletissimus
Emendatus auctus et ad annum MCMXX productus

The following principles have been adopted in connection with the revision :—

All botanical plates and figures are cited as they are given in the respective publications, and no attempt has been made to correct the name of a plant which may now be known under some other name. Obvious errors, other than taxonomic, have, however, been corrected. In order to obviate the disadvantage of the lack of uniformity in nomenclature those generic names which are now regarded as synonyms are cited under the generic names now generally accepted. For example, *Amygdalus* and *Cerasus* are cited under *Prunus* and cross-references are given from them to the latter genus.

References to figures of some of the more important hybrids have been included, but illustrations of the numberless garden varieties and forms of cultivated plants are not registered.

In citing the works in which the illustrations were published the system of abbreviations adopted for the *Index Kewensis* has been followed and a special list of titles in full is not included in the work.

Not only has the original Pritzel Index with its Supplement and the Kew Manuscript Supplement been typed out in card catalogue form for the purpose of preparing the present revision, but all the relevant literature in the libraries at Kew, the British Museum (Natural History), and elsewhere has been examined, and the necessary entries made. In addition very valuable assistance has been given by Botanists, particularly in France, Italy, Germany, Switzerland, Sweden, Austria, and the United States, and references to a very large number of figures, not readily available in this country, have been added, which will render the citations in the new Index almost complete.

The work is being printed and published by the Clarendon Press at Oxford and applications for copies should be sent to the Secretary, Royal Horticultural Society, Vincent Square, London, S.W.1.

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**Alfalfa Growing*.**—A comprehensive work under this title has recently been published in the United States. "Alfalfa" is, in general, the common name of *Medicago sativa* Linn. in Spain, South America and the United States; but in England, France and other countries the plant is better known as "Lucerne." It is probable that there is no other crop so widely grown in arid, semi-arid and humid climates. It is believed to be a native of Persia and from there the plant has spread over nearly the whole of the agricultural world and its cultural forms are recognised by such geographical names as "Provence," "Turkestan," "Arabian" and "Peruvian." "Grimm" Alfalfa is a hardy strain acclimatised by selection from seed taken by Wendelin Grimm from Baden in Germany to Minnesota. It is understood to be a hybrid between the "purple-flowered" or "common" Alfalfa and the "yellow-flowered" or "sickle" Alfalfa (*Medicago falcata* Linn.), a native of Europe, Siberia and Northern China, particulars of which the author includes in his work. These strains represent varying degrees of hardiness. It is possible to grow "Grimm" in the more rigorous climates, "Provence" and "Turkestan" are less resistant to cold and more suitable for the Temperate regions, whilst "Peruvian" and "Arabian" are classed as non-hardy and best adapted to Tropical and Sub-tropical areas. Given suitable conditions the plant is unequalled for feeding value, especially when supplemented by Maize, other grain, or grass-hay, and no country where cattle are bred on a large scale for "dairying" or "beef" can afford to be without it.

The author gives full particulars of the life-history and cultivation of this important crop, and the value of the book is greatly enhanced by a bibliography which includes about 650 references to the subject.

It may be mentioned in reference to the cultivation at home, covering perhaps more than 50,000 acres, that the Ministry of Agriculture have had from time to time various papers on the subject in their Journal and have issued a Leaflet (No. 160) on "The Cultivation of Lucerne." Notes on *Medicago sativa* have appeared in the Kew Bulletin, 1919, pp. 3 and 4, and Additional Series ix. pp. 186-190. J. H. H.

* Alfalfa-Growing in the United States and Canada, by G. Stewart. The Macmillan Company, New York, 1926, pp. xxiii+517, ill. 118. Price 15*s.* net.

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